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KEEPING C&D MATERIALS
OUT OF LANDFILLS

Conserving Resources and Minimizing Waste in the Construction Industry

A Report by the Ontario
Construction and Demolition (C&D)
Waste Reduction Strategy Team

OCTOBER 1993

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KEEPING C&D MATERIALS OUT OF LANDFILLS:

Conserving Resources and Minimizing Waste in the Construction Industry

A Report by the Ontario Construction and Demolition (C&D) Waste Reduction Strategy Team

OCTOBER 1993

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ABSTRACT

The Construction and Demolition (C&D) Waste Reduction Strategy Team was formed in April, 1992, at the invitation of the Waste Reduction Office of the Ontario Ministry of the Environment and Energy. The membership of this multi-stakeholder group comprises representatives from the construction industry (including construction industry associations, design professionals, and individual companies), recycling associations, municipal and provincial agencies, labour and public interest groups. Its mandate is to offer advice concerning practical ways to maximize the diversion of C&D materials, generated during residential/IC&I construction, demolition, renovation, and road construction, from Ontario's landfills.

This report summarizes the current solid waste management and waste diversion activities practised by the construction industry in this province. It identifies the barriers to greater diversion, and describes a series of proposed Action Plans that would address these barriers, reduce waste generation, and optimize diversion. The strategic implementation of these Action Plans, as well as the role the C&D Waste Reduction Strategy Team may play in their implementation, is discussed.

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A Note to Readers

Comprehensive data documenting the current production, use and disposal of construction and demolition materials and wastes in Ontario has not been widely published. The figures and statistical analyses presented in this report are based on the best information available. Estimates are conservative and valid in accordance with the knowledge and experience of the members of the C&D Waste Reduction Strategy Team. It is believed they represent a realistic picture of the waste management activities of the construction industry in Ontario.

Acknowledgement and Disclaimer

This report was prepared by the Ontario C&D Waste Reduction Strategy Team, a multi-stakeholder group with representatives from the private and public sectors, construction industry, design professionals, recycling associations, labour and environmental groups. The views and ideas expressed in this report are those of the strategy team members and the organizations they represent and do not necessarily reflect the views and policies of the Waste Reduction Office or the Ministry of Environment and Energy. In addition, mention of trade names or commercial products does not constitute an endorsement or recommendation of their use.

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#3 Develop building environmental rating program
#4 Disseminate newly-developed 3Rs educational material
#5 Promote building maintenance practices
#6 Develop and deliver on-site 3Rs communications
#7 Document 3Rs case studies
#8 Integrate pollution prevention into sector business strategy
#9 Develop asphalt and concrete education program
#10 Consolidate market information resources
#11 Expand markets through BUILD GREEN programs
#12 Develop and promote procurement policies
#13 Design and deliver market development workshops
#14 Develop economic incentives for recycling
#15 Utilize MTO reuse/recycling potential
#16 Optimize recycling potential of road building specifications
#17 Specify 3Rs plans in construction contracts at tender stage
#18 Consolidate MRF "bale" specifications
#19 Develop end-use specifications and standards
#20 Promote effective utilization of asphalt and concrete resources
#21 Provide industry guidance on environmental regulations
#22 Develop model 3Rs plan(s) for municipal approvals and permitting
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EXECUTIVE SUMMARY

"Keeping C&D Materials out of Landfills" is a report of the Ontario Construction and Demolition (C&D) Waste Reduction Strategy Team, a multi-stakeholder group comprising representatives from the construction industry (including construction industry associations, design professionals, and individual companies), recycling associations, municipalities, government agencies, labour and public interest groups. The report highlights some of the current waste diversion activities of the construction industry, municipalities and provincial agencies, and provides a blueprint for building on those successes.

The C&D Waste Reduction Strategy Team was assembled at the invitation of the Waste Reduction Office of the Ontario Ministry of Environment and Energy to develop practical plans for maximizing the diversion from disposal of C&D materials generated during residential/IC&I construction, demolition, renovation, and road construction. Involvement in the team's deliberations would also ensure that affected stakeholders have an opportunity to contribute to Ontario's long-term 3Rs policies.

The C&D Waste Reduction Strategy Team was asked to prepare a report that outlined its proposed plans for diverting materials from disposal (through the 3Rs of waste management) and, further, to obtain the continued commitment of strategy team members and other stakeholders for the implementation of those plans.

Members of the C&D Strategy Team, participating on one or more of four Task Groups, began by identifying the various economic, regulatory, technical, educational and perceptual roadblocks or barriers that, currently, limit the diversion of additional C&D wastes from disposal. Following this activity, each of the Task Groups — Source Reduction, Job-Site Management, Market Development, and Road Construction — developed a set of inter-related Action Plans to address these barriers.

The 26 Action Plans contained in this report are designed to incorporate or promote the 3Rs hierarchy of waste reduction, reuse and recycling. Wherever possible, they build upon sectoral waste reduction efforts already underway, and complement provincial efforts to divert solid wastes from landfill and other disposal options.

Individually, the Action Plans address such needs as: education and communication; the development of viable markets and other economic incentives for reuse and recycling; the incorporation of waste reduction components in specifications and standards; and the development of appropriate 3Rs technologies and infrastructure. Collectively, the plans comprise a strategy for diverting C&D wastes from disposal in Ontario.

Unfortunately, stakeholders in both the private and public sectors are experiencing unprecedented economic constraints. The resources needed to implement all of the proposed Action Plans may not be immediately available. However, it is the consensus opinion of the strategy team that much of the C&D materials currently going to disposal have an intrinsic economic worth and that C&D secondary materials should be viewed as a potential resource.

To maximize the utilization of this resource, the C&D Waste Reduction Strategy Team has suggested a select number of lead agencies that could most expeditiously undertake the coordination, facilitation and implementation of the proposed Action Plans. For each Action Plan, additional organizations whose efforts could support or complement the objectives of the plan have also been identified. Lead agencies would be asked to indicate their commitment, in writing, to complete the proposed Action Plan(s), review and refine the plan(s), assess the external support necessary (if any), and begin implementation at the earliest possible date.

In order to sustain the current momentum and cooperative spirit of the stakeholders, it is recommended that two progress meetings be scheduled for November, 1993, and April, 1994, in order that lead agencies can report on the progress made in implementing their selected Action Plans. Written proceedings could be produced and distributed to all interested stakeholders.

"Keeping C&D Materials out of Landfills" summarizes the current solid waste management and waste diversion activities practised by the construction industry in this province. The report also: outlines the mandate, structure and accomplishments to date of the C&D Waste Reduction Strategy Team; identifies the barriers to greater diversion; and contains the full text of the 26 proposed Action Plans that would address these barriers, develop techniques to overcome them, and maximize diversion. The strategic implementation of these Action Plans, as well as the role members of the C&D Waste Reduction Strategy Team (and other stakeholders) may play in their implementation, is discussed.

The development of this report reflects the commitment of the construction industry, municipalities, the Ontario government and other stakeholders to waste reduction. The proposed Action Plans represent feasible and practical opportunities for implementing the 3Rs. Their implementation will help maximize the diversion of C&D materials from disposal and the conservation of these important resources.

Introduction

It's not garbage until someone throws it away

Every year, thousands of tonnes of valuable construction materials end up in Ontario's landfills. Construction wastes and demolition debris account for a significant proportion of Ontario's solid waste. Estimates range from 10 to 30%. But while the brick, drywall, wood and other building materials are wasted, they are not, intrinsically, waste.

The construction industry has embraced the principles of waste reduction, reuse and recycling to divert significant amounts of useful C&D materials from disposal. The industry has also augmented the traditional 3Rs, with waste diversion initiatives that are based on retaining, repairing, and renovating buildings and structures. The industry realizes that recapturing resources from the waste stream is not only good for the environment, it's good for business.

But more can be done to minimize the amount of material being dumped in Ontario's municipal landfills or hauled to disposal sites in the United States.

For example, virtually all of the asphalt removed during road repair and reconstruction could be recycled into new paved roads, and all the broken concrete crushed into aggregate. More architects could employ innovative building design guidelines and specifications that call for the use of recycled and recyclable materials. More builders could adopt low-waste construction techniques that would further reduce the amount of lumber, drywall, masonry, siding, cardboard packaging and other materials that are hauled away from the site. Even the kitchen sink can be reused; there is a growing market for the fixtures and other materials saved and removed during building renovation or deconstruction.

Report outlines diversion strategy

"Keeping C&D Materials Out of Landfills," the report of the Ontario Construction and Demolition Waste Reduction Strategy Team, assesses current industry efforts to divert construction materials from disposal and provides a blueprint for building on those successes. It addresses the municipal solid wastes generated in the building construction and renovation sector, the demolition sector, and the road building and engineering construction sectors. Hazardous and liquid industrial wastes were not considered.

The report quantifies the status of current 3Rs efforts and waste disposal activities, identifies the barriers to further diversions, and recommends a series of initiatives designed to address these challenges. These recommendations take the form of an integrated series of 26 Action Plans that, collec-

Plans that, collectively, form a waste diversion strategy.

Chapter 1 of this report, "The Construction and Demolition Industry in Ontario," describes the structure and organization of the industry, as well as the composition and amount of C&D material going to disposal. The chapter covers the industry's success in implementing the 3Rs in project design, construction and eventual demolition. It addresses the need to find viable, long-term markets for both recyclable materials and materials containing recycled content. In addition, a series of "mini-profiles" describe the current uses and recyclability of the major classes of building materials.

Chapter 2, "Construction and Demolition Waste Reduction Strategy Team," describes the membership, organization and objectives of the C&D Strategy Team. The stakeholders assembled themselves into four expert subcommittees: the Source Reduction Task Group, the Job Site Management Task Group, the Market Development Task Group, and the Road Construction Task Group. The mission statements and goals of each of the task groups are also found in this chapter.

Chapter 3, "Barriers and Roadblocks," covers those educational and communication barriers, market and economic barriers, specifications and standards, regulatory barriers, and technological and other infrastructure barriers that act to inhibit the diversion of C&D materials from disposal and/or the establishment of effective and efficient 3Rs programs.

Chapter 4, "The Action Plans," presents the results of the task groups efforts. Each task group assessed the roadblocks to C&D materials diversion and proposed specific Action Plans that would overcome them. These Action Plans (each of which includes a step-by-step implementation plan, estimated completion time, and list of potential organizations responsible) form the heart of this report. (The full texts of the detailed Action Plans can be found in Appendix B.) Several Action Plans are already being pursued and have produced tangible results, such as the release of the Ontario Construction Industry 3Rs Code of Practice and the publication of Designing with the Environment: A Professional's Guide. These accomplishments are described in Chapter Two.

Chapter 5, "Implementing the Action Plans," recommends how the members of the C&D Waste Reduction Strategy Team can overcome short-term resource constraints and implement the most immediate of the proposed Action Plans. An amended organizational structure is proposed for ensuring the most efficient allocation of resources and facilitating cooperation among affected stakeholders.

The report concludes with a series of appendices, including a list of common acronyms, the text to the Action Plans, the Terms of Reference of the C&D Waste Reduction Strategy Team, and a list of its members.

About the C&D Strategy Team

The Strategy Team is a multi-stakeholder committee, assembled at the invitation of the Waste Reduction Office. It comprises more than 40 private and public groups and individuals, including construction industry associations, labour, waste haulers, recycling associations, design professionals, environmental groups, and others.

The spirit of cooperation and the contributions of the stakeholders over the past year has been impressive. Strategy Team Members have contributed more than two thousand hours of their time to the work of the C&D Strategy Team, the drafting and amendment of the proposed Action Plans, and the compilation, design and editing of this report. This represents a significant investment by the representatives, and reflects the serious and significant commitment of the construction industry to waste reduction.

At the same time, the process has enabled the participants to share concerns, develop a common database of information, and begin developing a strategy that could benefit all stakeholders. The proposed Action Plans represent feasible and practical opportunities for implementing 3Rs options that can maximize the diversion of valuable resources from disposal and promote the long-term health of the industry.

Chapter 1

Construction and Demolition in Ontario

The construction industry is a major employer in Ontario, utilizing the skills of 10 per cent of the province's workforce — approximately 400,000 workers. These numbers include architects and engineers, building contractors and developers, building tradespeople, manufacturers supplying these industries, and employees of demolition companies, who dismantle structures. In 1992, the Ontario construction industry was represented by approximately 38,000 companies. In that same year, the economy benefited from almost $35 billion dollars spent on construction. (See Tables 1.1 and 1.2 on page 6.)

The Ontario construction industry can be divided into three categories; Building Construction, Engineering Construction and Demolition.

- ***Building Construction***, (both Industrial, Commercial and Institutional (IC&I) and Residential) is made up of:
  - *Developers/Owners* who provide financing for construction projects, acquire land and building permits, and commission designs from architects or engineers. A developer is anyone who commissions a building design, including private sector, IC&I and residential developers and public sector agencies, crown corporations and school boards. Developers/owners are waste generators to the degree that they determine the budget, design, size, and materials used for the building project, as well as the fate of many existing buildings. While architects and engineers may suggest waste-reducing building techniques, or the use of recycled-content building materials, the client has the final say on such suggestions.
  - *Builders/general contractors and Sub-trades/sub-contractors.* Builders/general contractors control the main contract of a construction project and supervise the work performed by sub-trades and sub-contractors on construction projects. On a residential building project, the builder may also act as the architect.

These companies can affect waste reduction through the adoption of sound building practices, and the promotion and practice of on-site waste management. Construction contractors have an advantage over demolition companies, regarding waste management, in that they handle building materials in a pure and uncontaminated state, when separation of materials can be most effective.

The Toronto Construction Association estimates that, in 1991, the

Greater Toronto Area (GTA)'s IC&I sector was serviced by between 5,000 and 10,000 contractors. These companies ranged in size from family businesses to multi-national firms. Almost two-thirds of these companies employ between 2 and 50 people. Dun and Bradstreet estimates that there were 25,000 contractors serving Ontario in 1990, of which 4,800 were residential contractors.

Because many of these sub-contractors are small companies, the development of sound 3Rs practices is limited by slim profit margins and a lack of funds, facilities and expertise to devote to educating workers in 3Rs waste management principles. Builders and contractors may find it difficult to supervise waste management practices, because construction projects are served by numerous sub-contractors, who can spend as little as a few hours on a construction site. Many of these companies also dissolve and re-establish themselves as economic activity levels rise and fall.

IC&I construction companies are represented through such associations as the Council of Ontario Construction Associations (COCA) and local affiliates. Residential construction contractors are represented through such associations as the Ontario Home Builders' Association and their local affiliates.

- ***Engineering Construction***

Construction companies are involved in engineering work on projects such as sewers, watermains, sewage and water treatment plants, electric power plants, roads, bridges and subway systems. These companies, in particular, affect the generation and recycling of excess asphalt and concrete. Because most road building work is contracted by municipalities or by the provincial government through the Ministry of Transportation, the waste reduction activities of this sector are easily influenced through public policy.

Ontario is served by approximately 500 to 600 road building companies, including sewer and watermain contractors. Some of these companies are also asphalt companies, which act as contractors for road construction, hiring employees as needed.

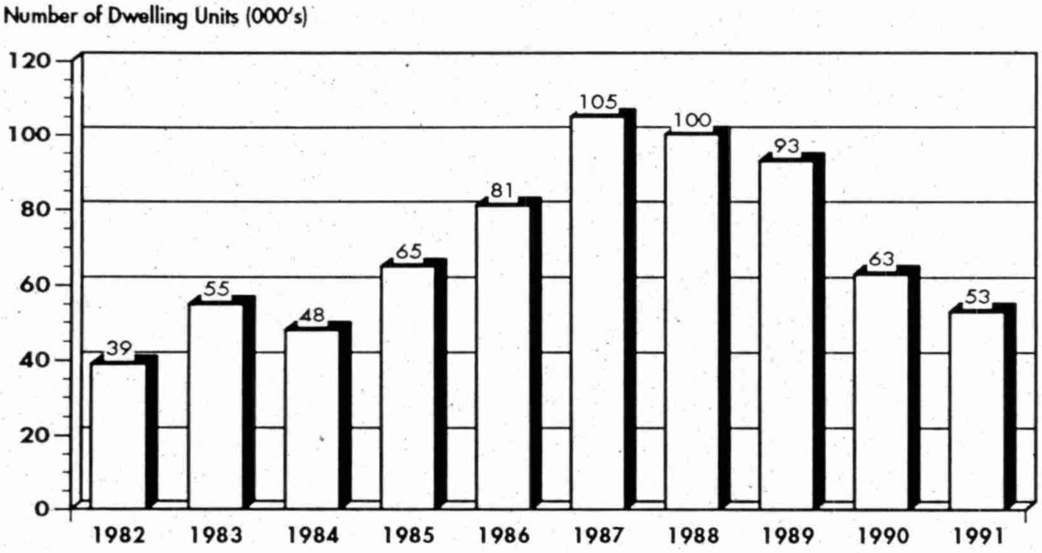
The Ontario Hot Mix Producers Association estimates that Ontario is served by approximately 85 companies which produce asphalt in 145 plants. Six of these companies are considered large, operating 6 to 10 plants each; 15 to 20 are considered medium, operating from 2 to 5 plants each; the rest are considered small, operating one plant each.

Road builders are represented by the Ontario Road Builders Association, and the Ontario Good Roads Association, while asphalt producers are represented by the Ontario Hot Mix Producers Association. Concrete producers are represented by the Ready-Mixed Concrete Association of Ontario. The Ontario Sewer and Watermain Contractors Association and the Ontario Aggregate Producers Association also represent firms engaged in related road construction activities. COCA represents construction trade associations across Ontario.

- ***Demolition***

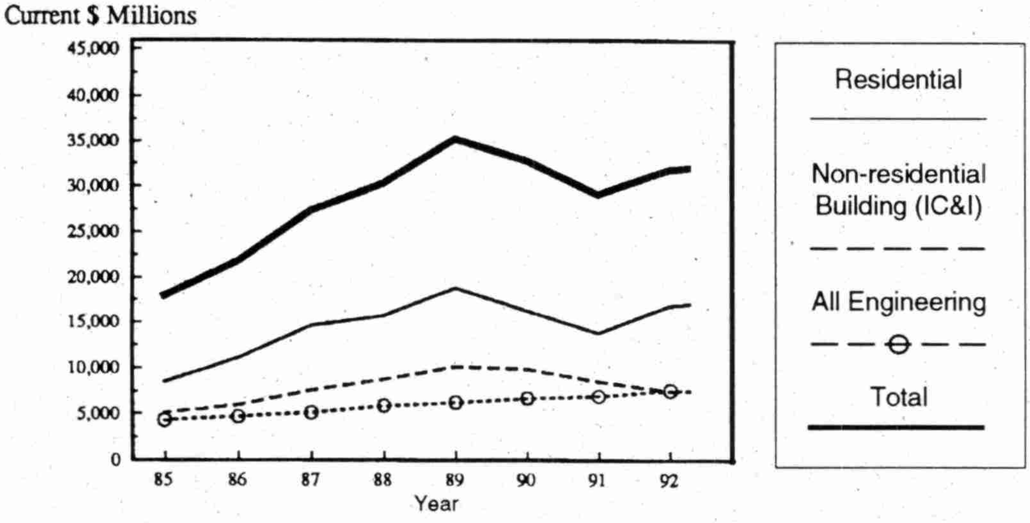
Demolition companies are contracted to dismantle existing structures. This function is usually carried out by one company on each demolition site. In the GTA, the market is served by four or five large companies and up to 30 smaller companies. Demolition companies can affect waste generation through on-site source separation and directing materials to recycling companies. However, demolition offers no "typical" job site. In tearing down a manu-

TABLE 1.1
HOUSING STARTS IN ONTARIO 1982-1991



Source: Canada Mortgage and Housing Corporation

TABLE 1.2
NEW CONSTRUCTION IN ONTARIO



Source: The CANADATA Annual Construction Forecast 1993-1995 Edition facturing plant, for example, a demolition company may find a high proportion of recyclable metal. On the other hand, the demolition of an apartment building may generate a large amount of mixed and contaminated material, probably destined for landfill.

Demolition companies are not represented by a formal province-wide association, although GTA demolition contractors are represented by the Metro Toronto Demolition Contractors Association, which accounts for 80% of the industry's workforce.

THE REGULATORY FRAMEWORK

The disposal of municipal solid wastes, including construction industry waste, falls under the regulatory powers of the federal, provincial and municipal governments. The significant legislation includes:

- **The Ontario *Environmental Protection Act***

The *Ontario Environmental Protection Act* is the primary piece of environmental protection legislation used to control emissions to air, land and water. It defines the meaning of the term "Waste" and empowers the Ontario Ministry of Environment and Energy (MOEE) to regulate the establishment of all waste disposal, transfer and hauling systems.

- **The Ontario *Environmental Assessment Act***

The *Ontario Environmental Assessment Act* is used to determine the environmental impact of public sector and certain private sector projects while they are still in the planning stage. Municipal or private proponents of a proposed landfill must prepare detailed information on the need, alternatives to, use, and full environmental impacts of the project.

- **The *Waste Management Act, 1992***

The *Waste Management Act*, an amendment to the Ontario *Environmental Protection Act*, began life as Bill 143, which was passed in April of 1992.

Ontario is committed to a 50 per cent diversion from disposal by the year 2000. The reductions in landfilled waste are calculated from the base year of 1987, when an estimated 9 million tonnes of municipal solid waste were generated. The *Waste Management Act* provides municipal and provincial governments with certain powers to help fulfil this goal.

Parts I to III of this legislation concern the siting and environmental assessment of three long-term landfill sites in the Greater Toronto Area. Part IV includes a series of enabling clauses that will allow the Province to enact regulations aimed at diverting waste from landfill.

Five 3Rs regulations were announced on April 29, 1993. Under the regulations:

- Major IC&I waste generators must prepare an annual audit of their solid wastes and prepare and implement a waste reduction workplan.
- Major IC&I waste generators must separate at source those solid wastes specified in the regulation and make a reasonable effort to ensure they are recycled.
- Major packaging users must prepare packaging audits and packaging reduction workplans.
- Municipalities with more than 5,000 residents must establish residential recycling programs, leaf and yard waste compost programs, and provide backyard composters.
- The approvals process for recycling facilities that meet certain siting/ operating standards will be streamlined.

C&D responsibilities under the new 3Rs regulations

You must prepare waste audits, waste reduction workplans, and set up source separation programs if you are responsible for:

- a large construction project of one or more buildings with a total floor area of at least 2,000 m^2. You will be required to separate corrugated cardboard, wood (not including painted, treated, or laminated wood), drywall (unpainted), steel, Portland cement concrete and brick for the purpose of recycling;
- a large demolition project, of one or more buildings, with a total floor area of at least 2,000 m^2. You will be required to separate wood (not including painted, treated, or laminated wood), steel, Portland cement concrete and brick for the purpose of recycling.

The waste audit and workplan requirements must be completed within six months. The source separation requirements will be phased in over a 12-month period.

- **Ontario's *Municipal Act***

Ontario's *Municipal Act* empowers municipalities to: enact municipal landfill bans, which permit the banning of potentially recyclable substances; and regulate landfill tipping fees. By charging higher fees, construction waste producers will consider other disposal measures, some of which will lead to waste reduction and recycling, provided there are markets for these materials.

Proposed amendments to the *Municipal Act* may give municipalities broader powers including the authority to:

- require source separation of waste and recyclables and charge user fees;
- establish and operate waste management facilities for collecting, reducing, reusing, recycling and disposing wastes;
- market products made from waste materials;
- enter business premises for the purpose of waste management planning, and;
- increase penalties for non-compliance of municipal waste by-laws.

- ***Municipal and provincial building preservation laws.***

These laws protect structures designated as having historical significance. Designation may require designers to reuse or incorporate existing structures into new projects.

- ***Federal and provincial building codes and codes developed by standards organizations*** may also have an impact on the use of recycled building materials. These include:

- The National Building Code and the Ontario Building Code determine whether or not recycled building materials meet its existing standards or are excluded out-of-hand because of prescriptive, rather than performance-based standards.
- The Canadian Standards Association (CSA), an independent testing group, which creates standards for certain building materials, then tests the materials against these standards. CSA standards are often reflected in law. Recycled-content building materials are often discriminated against, however, by standards which specify only virgin materials are to be used for construction.

- ***The U.S. Resource Conservation and Recovery Act*** determines the availability of landfill sites within the U.S. Changes to this act may force C&D companies to end the practice of exporting waste to Ontario border states.

CONSTRUCTION AND DEMOLITION (C&D) MATERIALS: WHAT IS PRODUCED, REUSED and RECYCLED

As a large, material-intensive industry, the construction industry generates large volumes of waste. In 1991, the GTHBA estimated that the construction industry generated 14 per cent of the waste volume that wound up in landfill sites — 5 per cent from residential construction and 9 per cent from IC&I, engineering construction and demolition (C&D) activities.

While province-wide figures on C&D waste generation by material type are not available, a study commissioned by Metropolitan Toronto in 1991 attempted to analyze C&D wastes by material and construction or demolition activity (see Table 1.3). A 1992 study conducted by MacViro Consultants for the MOEE determined the type and condition of waste materials one might expect to find in a range of C&D activities (see Table 1.4). The Greater Toronto Home Builders' Association has also determined the composition of the waste produced in the construction of the average low-rise residential building in Ontario. (See Table 1.5).

TABLE 1.3

COMPOSITION OF WASTE STREAM ENTERING METRO LANDFILLS FROM CONSTRUCTION, RENOVATION AND DEMOLITION ACTIVITY IN METRO TORONTO

(Based on percentage weight)

Waste Stream Component	Residential/ Commercial Low-rise Construction (%)	Residential/ Commercial High-rise Construction (%)	Commercial Low-rise Construction (%)	Renovation (%)	Demolition (%)	Combined C&D Average (%)
Wood	31.1	55.2	8	28	51.8	34.8
Rubble, aggregate & ceramics	23.1	7.4	29.1	36	24.7	24.1
Building Materials	10.7	3	40	21.1	7.9	16.6
Ferrous Metals	11.4	5.7	9.2	5.5	4.7	7.3
Paperboard	7.8	2.2	9.8	1.6	0.3	4.3
Paper	3.9	6.4	2.9	1.9	0.4	3.5
Glass	0.9	11.5	0.3	1.4	0	2.8
Plastic	7.2	1.8	0.7	2.4	0.7	2.5
Fines	0	1	0	0.3	8.7	1.9
Textiles	1.8	0.1	0	1.2	0.1	0.7
Organic	1.2	1.5	0	0.3	0	0.6
Rubber & leather	0.1	2	0	0.1	0.2	0.5
Non-ferrous metal	0.8	0.1	0	0	0.5	0.3

Source: Metropolitan Toronto Waste Composition Study, 1991

The expenditure method of estimating total C&D waste production may provide some insights. The Waste Reduction Office estimates that for every billion dollars spent on construction, 40,000 tonnes of waste are produced. Using this method, one could extrapolate provincial C&D waste figures of 1.6 million tonnes in 1989 and 1.5 million tonnes in 1992. (This does not include 3 million tonnes of roadbuilding materials, half of which is recycled).

While such figures are inadequate for detailed analysis of C&D waste streams, the information is useful as an indication of which waste materials are most commonly generated. For example, the combined results of these studies indicate that wood waste is by far the largest component of C&D landfill, followed by rubble and aggregate, mixed building materials, and drywall.

TABLE 1.4
WASTE STREAM COMPOSITION SUMMARY

ACTIVITY	WASTE STREAM COMPONENT	GENERAL COMMENTS
Construction	wood, excavated material, drywall, metal, concrete, OCC, paper, glass,ceramic/ceiling tiles, plastic, bricks, wiring, concrete blocks, insulation, carpeting	• items are generated on an individual basis • items are clean, unaltered
Demolition	wood, excavated material, metal, concrete, concrete block, drywall, plaster, equipment, white goods, wiring, insulation, ceramic/ ceiing tiles, fixtures, furnishings, carpeting	• items are generated simultaneously in mixed form • items are altered (e.g., painted)
Renovation	wood, excavated material, asphalt, drywall, metal, concrete, concrete blocksplaster, equipment, white goods, wiring, insulation, ceramic/ceiing tiles, fixtures, furnishings, carpeting	• items may be generated individually or simultaneously in mixed form, depending on the phase of the project • each item usually generated in small quantities
Road Construction	asphalt, concrete, excavated material, steel, natural wood (clearing/grubbing)	• generates large quantities of a few waste items

Source: Discussions with contractors, waste haulers, review of literature and observations made during site visits. Preliminary Study of Construction and Demolition Waste Diversion Constraints and Opportunities, MacViro Consultants Inc., March 31, 1992.

Historically, very little construction waste has found its way to recycling facilities. For example, an MOEE study published in 1990 painted a grim picture of wood waste management practices in Southern Ontario. Figures from 1988 showed that, of the total wood waste generated from residential construction (70,900 tonnes), only 7 per cent was recycled, reused or recovered. All of the wood waste (369,600 tonnes) from demolition activities was landfilled.

However, the volume of C&D materials winding up in landfills is declining. MacViro Consultants estimated that 600,000 to 800,000 tonnes of C&D waste were being taken to landfills in the late 1980s, approximately 15 to 20 per cent of total GTA landfill. In 1992, landfilled C&D wastes in Metropolitan Toronto dropped to 12,400 tonnes. While this may be interpreted as a sudden decrease in waste production, the figures may be misleading. While the disposal figure is probably accurate, it doesn't explain where the rest of the material has gone. Probable explanations for this drop in landfilled waste quantities include:

- A weak Ontario economy has put a damper on C&D activities. Because the construction industry is currently depressed there is simply less waste

TABLE 1.5
COMPOSITION OF WASTE STREAM PRODUCED BY LOW-RISE RESIDENTIAL CONSTRUCTION IN THE GREATER TORONTO AREA

Waste Stream Component	Percentage Volume (%)	Average Weight/ House (tonnes)
dimensional lumber	25	0.845
manufactured wood	10	0.424
drywall	15	n/a
masonry and tile	12	1
OCC	10	n/a
asphalt	6	n/a
metal wastes	4	n/a
plastic and foam	4	n/a
fibreglass	5	n/a
other packaging	4	n/a
other wastes	5	n/a

Source: Greater Toronto Home Builders' Association, Making a Molehill Out of a Mountain, 1990.

material created and the reduction in waste diverted to landfill is a partial reflection of a reduction in C&D activity.

- A considerable amount of waste material is still trucked to landfill, incineration and recycling facilities in Michigan, New York, and Pennsylvania, where tipping fees are lower than those in Ontario. Even with the added costs of transportation, the disposal of construction waste in the states surrounding the lower Great Lakes is economically attractive. Landfill tipping fees can run as low as 30 per cent of Ontario tipping charges, including the cost of transporting the waste from Canada. While landfill facilities in other states offer comparable tipping fees, the expense of additional transportation makes them less economically attractive as disposal sites. A study currently being conducted by the MOEE is attempting to determine how much Ontario waste is being diverted to American landfills.

The disposal of waste in American landfill sites is, at best, a temporary solution to local waste disposal problems. These landfill sites are filling up quickly. The New York state Department of Environmental Conservation estimates that only 37 of the 77 landfill sites in the state will be open by the end of 1994. Increased tipping fees at the remaining U.S. landfill sites and decreasing tipping fees at home (Metro) will slowly divert the southerly flow of C&D wastes back to Ontario.

- In recent years there has been an increase in illegal disposal activities. The MOEE recognizes this as a serious problem and continues to increase abatement and enforcement activities.

CURRENT 3Rs INITIATIVES

Source Reduction

Source reduction begins at the planning stage of a construction project, in the offices of architects, engineers and interior designers, as well as, at the planning stage of a demolition project, when salvage, deconstruction and material separation are considered. Also, retain, repair and renovate options should be explored by the owner before the final decision to demolish is made.

Design professionals have some control over waste reduction, to the degree that they can design a project using the least possible material, within building codes. Another possible alternative suggests that waste can be further reduced by designing buildings using standard, modular building units, either pre-cut or partially assembled before delivery to the construction site. In theory, this prevents wasteful off-cuts on the site. Efforts must be made to ensure that waste and off-cutting is not occurring where these modular units are manufactured.

Definite waste reductions can, however, be achieved through design innovations. Significant material conservation can be achieved over the life of an office building through such innovations as demountable and reusable office partitions to suit the numerous tenants a building must accommodate over the years. In just 10 years, the value of tenant-ordered changes to office buildings can rival the capital cost of the building.

Designers may also wish to reduce waste by recommending the use of more durable building materials. The use of slate, metal or clay tile as roofing materials, for example, will eliminate the waste generated by repeated reshingling using asphalt roofing tiles. However, clients may veto these suggestions if there are extra costs associated with these materials, or if these materials are perceived as experimental or untested. Designers and clients alike may also decide against the use of such materials if there is a fear of liability associated with their use.

Designers are also beginning to consider the concept of designing a building so that it can be deconstructed more easily and effectively when it ceases to meet the needs of its owners. A new drywall design, for example, uses drywall clips, not nails, which makes the drywall easier to remove and makes the drywall more desirable to recyclers.

Architects can also make the job of on-site management simpler, by planning for plenty of site space for bins and separation areas required for a successful waste management program.

Packaging waste can also be reduced by "cooperative purchasing" arrangements, purchasing building materials in bulk, where practical, and making excess packaging a factor in purchasing decisions.

"Taking aim at the 3Rs" (Fig. 1.1) shows a relationship between activities and initiatives undertaken by the different industry groups represented on the Strategy Team.

The figure is arranged as a target with new materials and products at the centre. This is perhaps the hardest target to hit; but with the emergence of products and materials, the second ring will be stimulated. The design commu-

Making A Molehill Out of a Mountain: Industry Response

When the Greater Toronto Home Builders' Association (GTHBA) published *Making a Molehill Out of a Mountain*, and its follow-up *Making a Molehill Out of a Mountain II*, the response from the construction industry was overwhelming.

"We've been receiving requests not only from our own members, but from builders, designers and engineers from across Ontario, Canada and the United States," says Stephen Dupuis, vice president of public and government affairs for GTHBA.

Dupuis says the response to the information has been extremely positive.

"I believe that the people who are requesting the reports have a genuine interest in using the information we've provided," says Dupuis. "They're not just looking at the publications as abstract theory."

The Toronto Region Architectural Conservancy (TRAC)

The Toronto Region Architectural Conservancy (TRAC) is dedicated to preserving buildings, rather than replacing them.

TRAC recommends that buildings should be maintained, repaired and renovated, leaving as much of the building fabric intact as possible.

By preserving buildings, the waste generated by demolition and new construction is largely eliminated and considerable embodied energy of the materials is conserved. This practice also preserves natural environments from which building materials are derived, as well as cultural and architectural heritage.

A success story - decommissioning the Etobicoke Goodyear Tire Plant

The 1989 demolition of the former Goodyear Tire Plant, in Etobicoke, Ontario provides an example of the type of waste reduction that can be achieved when both the owner of the property and the demolition company involved practice sound economic and waste management policies.

The Goodyear property provided plenty of space for on-site separation and storage facilities, and wood-shredding and aggregate-crushing equipment.

Recyclable materials salvaged from the site included:

- 1,000 tonnes of shredded wood;
- 1,000 tonnes of brick; and
- 50,000 tonnes of crushed concrete.

All of the materials salvaged were stored on site and the crushed concrete is being used in the redevelopment of the site. The aggregate was crushed to usable form at a cost of $6 per tonne. Disposing of the concrete and brick as lakefill and hauling new aggregate to the site would have cost $12/tonne.

nity can incorporate these in projects in addition to consciously reducing waste at source through design strategies. On-site practices must deal with the designs that are tendered. For every design that gets built, the education, training and implementation of on-site 3Rs practices will maximize the benefit of the resources being used.

Holding all these activities in place is the regulatory framework. It is represented as the outer edge of the target. Command and Control holds things in place, but the greatest gains are going to occur with new markets and materials, 3Rs conscious design and on-site practices.

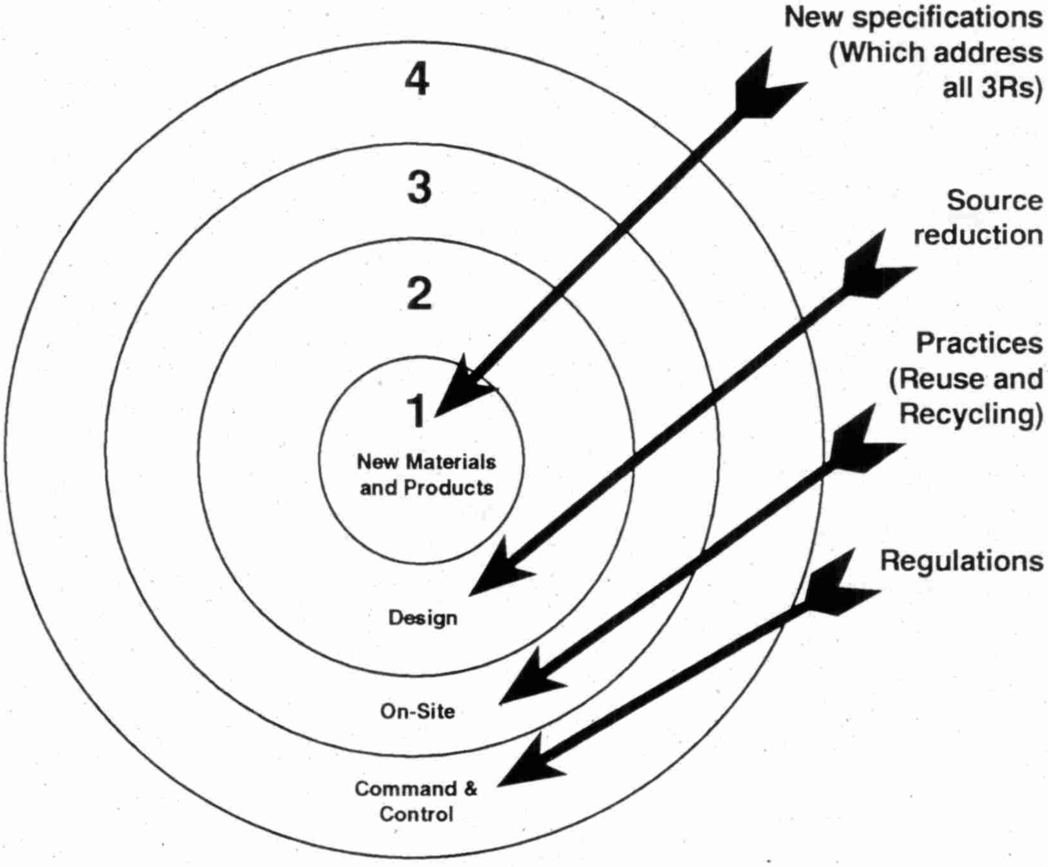
On-Site Management Principles

As the construction industry begins to recognize the importance of on-site waste management principles, recognized waste management techniques are beginning to emerge. Industry associations, such as the Greater Toronto Home Builders' Association have begun to offer information packages, waste audit forms, and waste reduction seminars to member companies.

Important waste management principles include:

- Conducting pre-project planning to determine the storage and collection

FIGURE 1.1
TAKING AIM AT THE 3Rs


New specifications (Which address all 3Rs)
Source reduction
Practices (Reuse and Recycling)
Regulations
4
3
2
1
New Materials and Products
Design
On-Site
Command & Control

facilities required for recyclable materials.

- Creating effective material inventory controls.
- Identifying reuse and recycling markets to ensure maximum diversion of materials from disposal.
- Providing clearly marked containers for recyclable materials.
- Educating workers to separate building materials on construction, demolition and renovation projects.
- Performing daily site clean-ups to prevent mixing and deterioration of recyclable building materials.
- Providing proper storage to protect recyclable materials from damage by the elements.
- Consolidating reusable construction materials in a central location. This makes reusable materials available to the entire construction project.
- Pre-processing material on site, whenever economically viable. Wood, for example, may cost less to manage if an on-site chipper is used to process waste wood prior to pick-up.
- Recognizing that, at present, some waste is unusable. While efforts should be made to find a use for most waste material, not all material is reusable or recyclable. Hazardous material, for example, must still be properly managed.

Markets for Recycled Materials

Many construction materials previously disposed of as waste are now being successfully recycled and marketed. It is recognized, however, that a consistent supply of high-quality recyclable material is required to sustain recycled materials markets. Large and consistent supplies of recyclable material create:

- economies of scale as processing prices decrease;
- increased consumer confidence, as purchasers come to depend on a guaranteed supply of recycled-content materials; and
- increased competition among recycling companies.

Unfortunately, recyclable materials are not always available in the form of recycled-content building materials when they are needed.

However, stable markets for recycled products depend on more factors than a consistent supply. These factors include:

- *An understanding of the reuse/recycling infrastructure by C&D companies.* Figure 1.2 graphically depicts the existing C&D reuse and recycling infrastructure. Waste generators in the construction industry require more detailed information to properly divert waste material to recycling facilities. Resources that promote such waste diversion are directories of recycling companies and the materials they are willing to accept.
- *The price and availability of virgin products.* While environmental concerns determine some purchasing patterns, a low-cost virgin material will almost certainly outsell a high-priced recycled-content material.
- *The cost of disposal.* A manufacturer of recycled-content construction materials may be guaranteed a large supply of material, separated and delivered by the generator, provided the cost of landfill tipping fees remains higher than the cost of delivery to the recycling site. A reduction in tipping fees could

The ReUze Building Centre

Private industry is attempting to encourage the use of 3Rs construction practices through such ventures as the ReUze Building Centre.

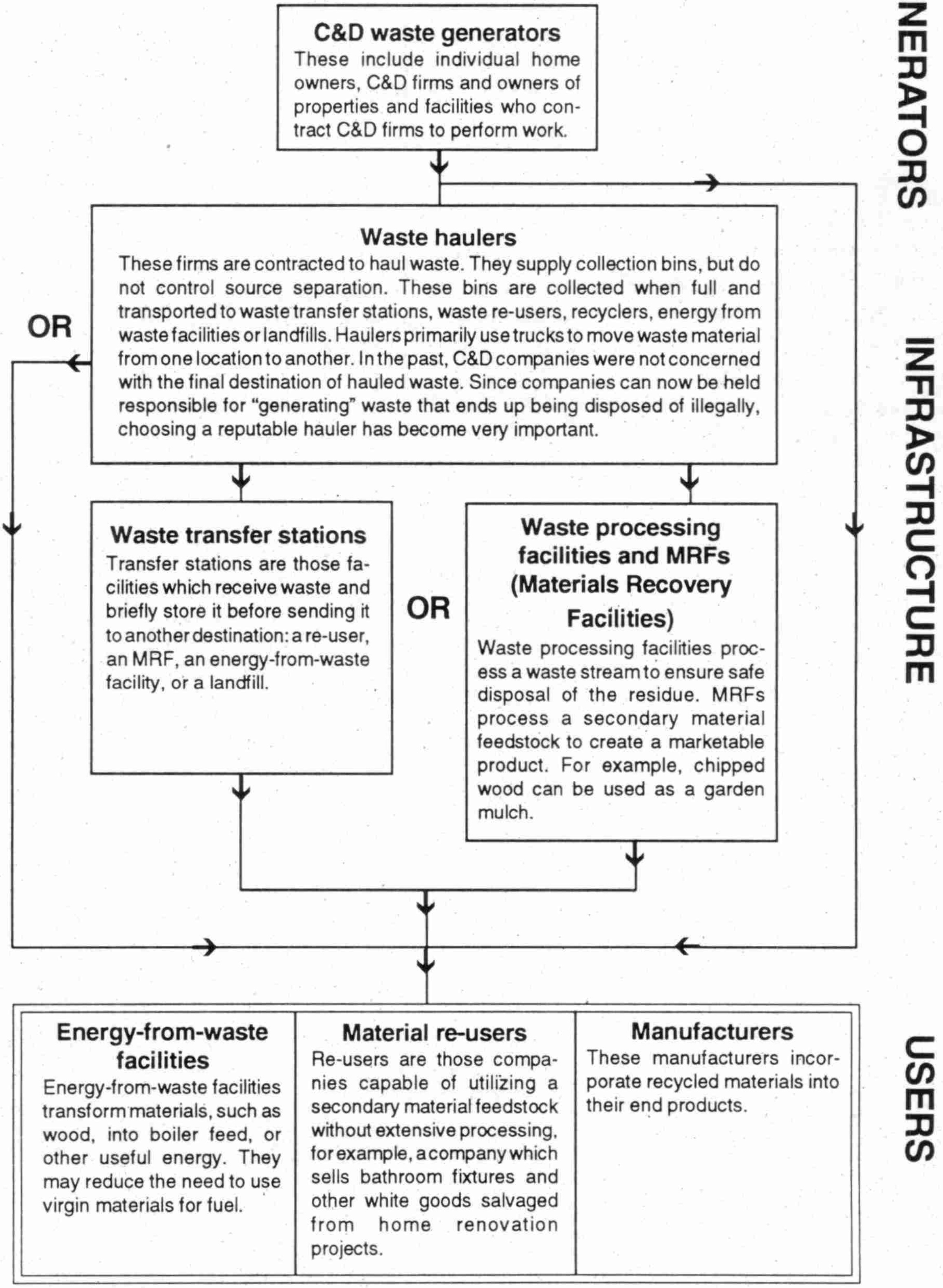
Located in Scarborough, the Centre offers used building materials for sale to consumers. Among its inventory, the Centre includes doors, windows, plumbing fixtures, cabinets, plus a wide assortment of other items.

Recycled-content building materials and components currently available

- attic baffles
- bathroom vanities
- beams made of strand lumber
- bricks
- carpets and undercushions
- ceiling grid components
- ceiling tile
- cement boards
- concrete foundations
- doors
- drywall
- eavestroughs
- gutters and downspouts
- insulation
- interior wood trim
- kitchen cabinets
- kitchen countertops
- office partitions and frames
- roofing materials
- siding
- wall panels.

FIGURE 1.2

C&D REUSE/RECYCLING INFRASTRUCTURE



C&D waste generators

These include individual home owners, C&D firms and owners of properties and facilities who contract C&D firms to perform work.

Waste haulers

These firms are contracted to haul waste. They supply collection bins, but do not control source separation. These bins are collected when full and transported to waste transfer stations, waste re-users, recyclers, energy from waste facilities or landfills. Haulers primarily use trucks to move waste material from one location to another. In the past, C&D companies were not concerned with the final destination of hauled waste. Since companies can now be held responsible for "generating" waste that ends up being disposed of illegally, choosing a reputable hauler has become very important.

Waste transfer stations

Transfer stations are those facilities which receive waste and briefly store it before sending it to another destination: a re-user, an MRF, an energy-from-waste facility, or a landfill.

Waste processing facilities and MRFs (Materials Recovery Facilities)

Waste processing facilities process a waste stream to ensure safe disposal of the residue. MRFs process a secondary material feedstock to create a marketable product. For example, chipped wood can be used as a garden mulch.

Energy-from-waste facilities

Energy-from-waste facilities transform materials, such as wood, into boiler feed, or other useful energy. They may reduce the need to use virgin materials for fuel.

Material re-users

Re-users are those companies capable of utilizing a secondary material feedstock without extensive processing, for example, a company which sells bathroom fixtures and other white goods salvaged from home renovation projects.

Manufacturers

These manufacturers incorporate recycled materials into their end products.

The Build Green Program

The Build Green Program is an initiative of the Greater Toronto Home Builders' Association (GTHBA) and ORTECH International. The goals of the program are to increase consumer and builder awareness of recycled-content building materials, to stimulate demand for these products, and to initiate the development of these new materials.

A pioneer project of the Build Green Program is the Build Green Resource Centre, built using recycled building materials and located in the MacDonald Block of Queen's Park in Toronto. The Centre, the first of its kind in the world, opened late last year to offer Ontario's designers, architects and engineers access to an information retrieval system for technical data on recycled-content building materials. It also provides actual samples of environment friendly building materials currently available.

Public interest in the Program has been strong. At the 1991 National Home Show in Toronto, the Program introduced more than 25,000 people to the Green Dream Home, built largely from recycled-content building materials. The response to the home was overwhelming, indicating that consumers are willing to accept "green" building materials, if they are shown to perform to the standards of traditional building materials.

A follow-up display, the Build Green Street, was presented at the 1992 and 1993 National Home Shows. It focused on Build Green construction materials and the role of the team of organizations that are participating in the Build Green Program. The Build Green Street is now on permanent display at Designer's Walk Resource Centre in Toronto.

One of the more visible aspects of Build Green will be the Build Green Label Program. The Build Green label will be available to builders, manufacturers, distributors and retailers who offer or produce renewable or recycled-content building materials. The label indicates the recycled content of the material, or whether the material is made using a renewable resource. Build Green Label products are scheduled to appear at major retail outlets in the coming months.

In September, 1993 more than 800 high schools across Ontario will receive Build Green Curriculum Resource materials, thanks to a unique partnership between Merlan Scientific, government and industry partners.

The development, testing and production of materials was supported by a grant from the Green Workplace Program, Management Board Secretariat.

Private sector sponsors have also contributed $50,000 in prizes as part of a province-wide Build Green Student Challenge. Students will be invited to submit stories, videos or a community plan that increases the awareness and use of recycled materials in building construction and renovation. A panel of experts from the education and construction sectors will select the winners.

Ontario Design Build Program

In March 1993, MBS published Environmentally Conscious Design Requirements for the Ontario Government Relocation Program which sets out the minimum requirements for planning new government buildings. The document details ways to reduce waste and promote the reuse and recycling of materials, cut energy use, conserve water, control indoor air pollution, and eliminate noise pollution.

Paint Recycling: What is Being Done

The Canadian Paint and Coatings Association (CPCA) has recently established the Canadian Paint Recycling Council (CPRC) to promote the recycling and reuse of paint wherever possible.

The goals of the Council are to collect, sort, test, rework and package recycled paint, and to develop markets for recycled paint products. By meeting these goals, the paint industry can reduce the effect of waste paint and paint containers on landfill sites.

One of the Council's objectives is to educate the public on delivering waste paint to collection depots. When a consistent supply is established, recycled paint will be available to consumers on a regular basis.

New technology for processing materials

A considerable number of C&D materials that could be recovered from the waste stream are not currently marketable. However, technological advances are opening new markets for these materials.

For example, two problem materials — asbestos and window glass — can now be combined at high heat to form a clean, non-hazardous fill material. Window glass can also be recycled into fibreglass, ground into powder and used as a component of lime/silica bricks, a new product now being tested. Unused asphalt shingles that are not marketable have been successfully incorporated into hot mix for paving. Paint is now being recycled in Ontario.

To take advantage of such recycling opportunities, C&D companies must keep abreast of the types of advances that transform waste into recyclable materials.

make the landfill option more economically attractive. Higher tipping fees and further material bans at landfills may help to establish consistent supplies of a given material. (See Table 1.6.) However, they may also lead to illegal disposal activities. Tipping fees in Ontario range from $0 to $150 per tonne, and while some landfill sites do not ban any material, others ban a wide range of materials.

- *The cost of storage, collection and transportation.* High storage, collection and transportation costs may cause the price of recycled-content materials to rise significantly.
- *The capacity of recycling facilities to collect, store and process materials.* While recycling activity in Ontario is steadily increasing, recyclers may be wary about expanding facilities while economic prospects appear uncertain.
- *The willingness of regulatory bodies to approve recycled-content building materials.* Groups, such as the Canadian Standards Association, can help to increase consumer confidence in recycled-content building materials by establishing performance-based standards.

TABLE 1.6
HISTORY OF METRO TIPPING FEES AND MATERIAL BANS
(fees charges at Metro landfill sites)

Year	Tipping Fee ($/tonne)	Banned Materials
1987	18	
1988	50	
1989	83	white goods, cardboard (20% tolerance)
1990	98	white goods, (cardboard (20% tolerance), tires, drywall
1991	150	white goods, (cardboard (0% tolerance), tires, drywall, uncontaminated wood, scrap metal, clean fill, concrete and rubble, petroleum contaminated fill, fine paper, off-spec and surplus goods
1993*	90	as above

Source: MOE, 1991. The Physical and Economic Dimensions of Municipal Solid Waste Management in Ontario.
* Metropolitan Toronto Works Department, May 1993.

- *A strong demand for recycled-content products.* Interest in purchasing recycled-content construction materials is increasing. The Ontario Waste Exchange reports that enquiries concerning C&D wastes have increased more than 500 per cent between 1990-91 and 1992-93. However, a strong marketing effort is required to help spur demand for these products.

Federal, provincial and municipal governments have attempted to create stable markets for many recycled products, including building materials, through an initiative known as Governments Incorporating Procurement Policies to Eliminate Refuse (GIPPER). The GIPPER program, for example, encourages government buyers to purchase recycled drywall, aggregates made of crushed concrete and masonry, and products made of chipped construction wood waste, wherever possible. GIPPER also encourages industries to practice proper on-site source separation and collection procedures. GIPPER'S Guide to Environmental Purchasing is available through the City of Toronto's Department of Purchasing and Supply.

C&D companies themselves, can also help to close the recycling loop, by using recycled-content materials wherever possible.

Mini-profiles of C&D Materials

In the following section the major categories of C&D materials are profiled. A brief description of the material itself, sources of secondary materials and opportunities for source reduction and recycling are discussed.

MATERIAL CATEGORY: *ASPHALT (PAVING)*

DESCRIPTION:

Paving Asphalt is a mixture of 5 per cent asphalt cement and 95 per cent aggregate. Paving asphalt can be used as a "cold mix" — crushed asphalt, aggregate, and stone, compacted to form a roadbase; or "hot mix — heated asphalt, compacted to form the road surface.

MATERIAL SOURCES:

Road and pavement repair, reconstruction, or demolition.

SOURCE REDUCTION:

Asphalt may be stripped from a road surface, crushed and used as granular or hot mix on the same or future road construction projects.

MARKETS FOR RECYCLED MATERIAL:

- OHMPA reports that there were at least 66 locations operating asphalt collection and recycling facilities in Ontario in 1993.
- As the most costly component of asphalt is asphalt cement, the economic advantage of using recycled asphalt depends on the price of oil. In 1993, low oil prices have evened out the cost of virgin and recycled asphalt. Any increase in oil prices would make virgin asphalt a significantly more expensive product.

Road asphalt recycling achievements

At least 50 per cent of excess road asphalt generated through repair and reconstruction activities is reprocessed into new material. Many road surfaces made up of 25 per cent recycled and 75 per cent virgin material meet MTO and OPSS road construction specifications and standards.

In 1990, 1,222,000 tonnes of old asphalt was reused as hot mix, while 1,493,000 tonnes were stockpiled.

MATERIAL CATEGORY: *BRICK, MASONRY & TILE*

DESCRIPTION:

Brick, masonry and tile are construction materials made up of kiln-fired mixtures of water, clay and sand.

MATERIAL SOURCES:

The Greater Toronto Home Builders' Association estimates that approximately 400 bricks are wasted for each home built. Approximately 200,000 to 400,000 tonnes of brick and masonry waste are generated in the GTA each year.

MARKETS FOR RECYCLED MATERIAL:

- There is a growing market for recycled brick, although these markets are not highly developed in areas where landfill costs are low and the materials are not banned outright from landfill sites.
- Some recycling companies will grind brick into granular material, to be used as aggregate for future construction.
- The recycling industry estimates it could process and market all the bricks supplied by C&D operations, if materials are provided to their specifications.
- Material contaminated with lead paint or mixed with contaminated rubble is not currently marketable.
- Refractory brick may contain heavy metals, fluoride and other contaminants and is not currently marketable.

MATERIAL CATEGORY: *CONCRETE*

DESCRIPTION:
Concrete is a construction material made of a hardened mixture of cement, sand, stone and water.

MATERIAL SOURCES:
Concrete waste is produced in the construction, renovation and demolition of bridges, roads, sidewalks, buildings, foundations and structural elements.

MARKETS FOR RECYCLED MATERIAL:

- Concrete can be crushed and used as aggregate for road beds, provided it passes a density test to determine its suitability. On-site crushing of concrete may prepare the material for both on- and off-site use.
- There are at least 100 companies in Ontario that will accept concrete for processing or end use.
- The Ontario Ministry of Natural Resources estimates that 968,000 tonnes of reclaimed concrete aggregate was used in 1990, and 776,000 tonnes were stockpiled for future reuse and recycling.
- Ontario sources of virgin aggregate are being depleted. This indicates a brighter future for the use of crushed concrete as aggregate.
- A pilot project in the U.S. has determined that concrete can be crushed to powder and re-used as a paving compound; however, there is no indication that the process is commercially viable.
- While some dealers accept concrete containing steel reinforcing bars, it makes the material less valuable, due to the cost of separating metal from concrete.

Recycled aggregate from concrete rubble

The Skydome project recycled 122,000 tons of concrete back into structures and parking lots. MTO used 23,000 tons of recycled concrete aggregate on the Highway 401/Warden Avenue interchange project in Toronto. 8,000 tonnes of recycled concrete aggregate were used to construct the new student parking lot at Brock University.

MATERIAL CATEGORY: *DRYWALL*

DESCRIPTION:

Drywall is a construction material made of gypsum compressed between two layers of paper. As its name suggests, the product is used to build interior walls.

MATERIAL SOURCES:

- The MOEE estimates that residential sources generated 11,500 tonnes of drywall waste and that IC&I sources generated 130,000 tonnes of drywall waste in 1989.
- The Greater Toronto Home Builders' Association estimates that approximately 400 kilograms of drywall are wasted on the site of each home built. (Roughly 1 lb. of waste per square foot of construction.)

MARKETS FOR RECYCLED MATERIAL:

- The Ontario Waste Exchange reports that there were at least 15 firms operating waste drywall collection and recycling businesses in the Greater Toronto Area in 1991. The drywall is separated into paper and gypsum, drywall's two major components. Currently, the drywall recycling market is dominated by three major players.
- Recycling companies will accept drywall according to their specifications. Some dealers prefer new construction drywall or renovation off-cuts, while others will not accept painted or vinyl-coated drywall at all.
- The MOEE estimates that all of the waste drywall generated in new construction could be recycled.
- Drywall contaminated with paint, or an abundance of nails is not acceptable to some recyclers.

MATERIAL CATEGORY: *EXCAVATED MATERIAL (FILL)*

DESCRIPTION:

Excavated material, or fill, may include soil, rocks and sand removed from a construction or demolition site during excavation.

MATERIAL SOURCES:

Construction or demolition projects requiring excavation.

MARKETS FOR RECYCLED MATERIAL:

- Clean fill, free of chemical contamination, may be used in lake remediation, to fill excavations, or for other engineering applications. While there is no price paid for such fill, it provides a quick and inexpensive method of removing the material. Some generators of fill, however, express concern at the time it may take to dispose of this material in large quantities.
- More than 30 companies in the GTA will accept clean fill.
- Under the MOEE's Proposed Policy for Management of Excess Soil, Rock

and Like Materials, fill would be divided into four categories: (i) inert fill; (ii) urban residential fill; (iii) urban industrial fill; and (iv) controlled fill. Under this proposal, fill would be tested and graded before it is used for any application, potentially limiting existing uses and markets of fill.

- Excavated material is not acceptable as fill if it is contaminated by oil, heavy metal and other contaminants, which would render it a waste product, destined for a landfill site. Metro landfills received approximately 14,000 tonnes of contaminated material in 1992.

MATERIAL CATEGORY: *METAL*

DESCRIPTION:

Metal is used in a broad range of construction activities and falls into two categories:

- FERROUS METAL, which refers to all magnetic metal, such as iron and steel; and
- NON-FERROUS METAL, which refers to all non-magnetic metal, primarily lead, copper and aluminum.

MATERIAL SOURCES:

Recyclable ferrous metal can take the form of steel beams, supports, roofing, pipes, tools, nails, screws, hinges, cable, fencing and larger scrap. Recyclable non-ferrous metal can take the form of plumbing, piping, siding, doors, window frames, car ports and garden sheds.

MARKETS FOR RECYCLED MATERIAL

- The Ontario Waste Exchange reports that there were at least 87 firms operating waste metal collection and recycling businesses in the GTA in 1991.
- There is a mature, established market for metals. Steel mills and scrap yards are primary consumers of secondary metal. Prices paid for recyclable metals will rise and fall with the price of virgin products.
- Radioactive metals, or metal rebars still embedded in concrete are unrecyclable.

MATERIAL CATEGORY: *PACKAGING/OLD CORRUGATED CONTAINERS (OCC)*

DESCRIPTION:

OCC refers largely to cardboard boxes made of wood pulp, adhesives and staples.

MATERIAL SOURCES:

Largely made up of packaging waste, such as cardboard boxes, the Greater Toronto Home Builders' Association estimates that approximately 163 kilograms of OCC enter the waste stream for each home built. The construction industry in the GTA generates approximately 5,000 to 10,000 tonnes of OCC per year

MARKETS FOR RECYCLED MATERIAL:

- OCC is one of the most commonly recycled and desirable materials for recycling. The OCC recycling market is well serviced by dealers. Dealers may be reluctant, however, to accept Asian OCC because the material typically contains weakened cardboard fibre.
- There are limited markets for waxed cardboard, and currently none for cardboard contaminated with hazardous chemicals, wet and sun-bleached cardboard.

MATERIAL CATEGORY: *PLASTICS*

DESCRIPTION:

Plastics are petro-chemical by-products having a polymeric structure.

MATERIAL SOURCES:

- Plastics make up 2 to 3 per cent of construction wastes. These include:
- High Density Polyethylene (HDPE), used in plastic crates, plastic pails, plastic barrels, and traffic cones;
- Low Density Polyethylene (LDPE), used in shrink wraps;
- Polystyrene (PS), found in foam packaging;
- Acrylonitrile Butadiene Styrene (ABS), found in plastic plumbing; and
- Polyvinyl Chloride (PVC), found in plastic plumbing, vinyl siding, and roofing.

MARKETS FOR RECYCLED MATERIAL:

- There are approximately 30 recycling firms in Ontario that accept and process post-consumer resin. However, the infrastructure required for recycling post-consumer plastic resins is still under development.
- Almost any contamination, including the presence of certain resin types, can reduce the value or marketability of post consumer resins.

MATERIAL CATEGORY: *WOOD*

DESCRIPTION:

Wood-based construction materials are derived from trees. Wood debris, referred to as clearing and grubbing material, is generated by land clearing operations. Future supplies will depend on the proper management of this renewable resource.

MATERIAL SOURCES:

It is estimated by the MOEE that in 1988, demolition companies generated 369,600 tonnes of wood waste, while residential construction companies generated 70,900 tonnes.

This material includes:

- Building Material: includes veneer, particle board, plywood, lathing, flooring, doors, frames, lumber, forms and mouldings, off-cuts.
- Packaging: includes wooden pallets, skids and crates.

MARKETS FOR RECYCLED MATERIAL

- The Ontario Waste Exchange reports that there were at least 29 firms operating wood waste collection and recycling businesses in the Greater Toronto Area in 1991. Studies indicate that the wood recycling industry has the capacity to accept all of the clean wood waste produced in Ontario.
- Although wood has been available to produce sawdust or firewood for some time, more innovative projects that reuse or repair wooden items are expanding the market for recyclable wood.
- Purchasers of recyclable wood include:
  - Pulp and paper manufacturers
  - Manufacturers of chip, particle board and oriented strand board
  - Pet and livestock litter and bedding processors
  - Compost/mulch processors
  - Fire log processors
  - Energy recovery installations.
- New companies are establishing a market for natural wood chips, utilizing raw stumps and brush.
- Wood materials not currently being recycled include painted, pressure-treated and manufactured wood products, such as particle board. Such wood contains potentially toxic chemicals that may be released during recycling or combustion.

Chapter 2

Construction and Demolition (C&D) Waste Reduction Strategy Team

In February 1992, the Waste Reduction Office of the Ontario Ministry of Environment and Energy invited a number of stakeholders in the construction industry to meet and offer their expert advice on ways to maximize the diversion of C&D materials from disposal. More than 40 representatives agreed to participate and, agreed by consensus, to the Terms of Reference.

The C&D Strategy Team represents a variety of both private and public groups and individuals, including construction industry associations, labour, waste management and recycling associations, design professionals, environmental groups, and others.

The formal mission of the C&D Strategy Team is to develop strategies and practical recommendations that would result in the diversion of C&D materials from disposal, in keeping with the provincial government's objective of reducing wastes 25% by 1992, and 50% by the year 2000. The Strategy Team was asked to prepare a report that outlined its proposed plans for diverting materials from disposal (through the 3Rs of waste management) and, further, to obtain the continued commitment of Strategy Team members for the implementation of those plans.

In order to focus its efforts and maximize the contributions of its members, the C&D Strategy Team struck four smaller Task Groups. Each Task Group was directed to identify the various economic, regulatory, technical, educational and perceptual roadblocks and barriers that, currently, limit the diversion of additional C&D materials from disposal. Solutions to these barriers and other opportunities, based on the 3Rs hierarchy of waste reduction, reuse and recycling, are embodied in a series of formal Action Plans.

The 3Rs recommendations are designed to build upon waste reduction efforts already underway and complement provincial efforts to divert solid wastes from landfill. Collectively, the Action Plans comprise a strategy for diverting C&D materials from disposal in Ontario.

The following four Task Groups were established (the first three in the Spring of 1992 and the fourth in October of that year):

Task Group 1, Source Reduction
Task Group 2, Job-Site Management
Task Group 3, Market Development
Task Group 4, Road Construction

Task Group members were asked to participate in meetings, provide input and advice on relevant issues, and undertake specific work tasks (as necessary) to develop consensus on an appropriate mix of 3Rs activities. Members were encouraged to communicate to their respective stakeholder groups the results of the Task Group meetings, as well as any action items their stakeholder group was requested to undertake.

MISSION STATEMENTS AND GOALS FOR TASK GROUPS

Task Group 1
SOURCE REDUCTION

This is the "front-end" group, made up of designers and architects, procurement officers, developers, engineers, specification & standard writers, and so on. Its work is based on the 3Rs hierarchy and places particular emphasis on source reduction opportunities (the so-called first "R"). Task Group 1 focuses on initiatives that would make the 3Rs an essential part of planning and see the elimination of waste at source — through building preservation, innovative design, specifications and standards that promote and support the 3Rs, etc. — from construction through to demolition. The development of effective communication and educational mechanisms is an important component of the Action Plans drafted by Task Group 1.

Goal: To develop a province-wide C&D source reduction strategy and recommend procedures to avoid generating C&D wastes.

Task Group 2
JOB-SITE MANAGEMENT

The membership of this Task Group includes general contractors, trades people, etc. It focuses on job site measures that would maximize source reduction, reuse and/or recycling of C&D waste materials. Based on the 3Rs hierarchy, its Action Plans address issues related to collection, source separation and storage, codes of practice, worker training and education, improved material handling and utilization, and other on-site techniques. Again, effective communications is vital to the success of the recommendations made by Task Group 2.

Goal: To develop a province-wide 3Rs job-site waste material reduction strategy and recommend practical techniques to divert C&D materials from disposal.

Task Group 3
MARKET DEVELOPMENT

Membership in the Market Development Task Group included recyclers, municipal and waste management industry representatives. Its work emphasized both the second "R" (material reuse) and the third "R" (recycling). The solutions identified are designed to close the recycling loop and support the development of the recycling infrastructure and secondary material markets, including the specification and utilization of building materials that are recyclable and/or contain recycled-content, and ensure that design standards do not inhibit the use of recycled materials.

Goal: To create a province-wide recycling infrastructure and market development strategy that promotes growth in the demand for (and encourages the use of) C&D-derived secondary materials that keeps pace with the available supply.

Task Group 4
ROAD CONSTRUCTION

Due to the tremendous volumes of materials generated (primarily soil, asphalt and concrete) and the potential for their diversion from landfill, the "Road Construction" group was formed to develop strategies specific to that sector. The Task Group also recognizes the fundamental operational differences between road building and IC&I and residential construction.

Members of the Task Group included spokespersons for industry and professional associations representing road builders, asphalt producers and municipal engineers, as well as the Ministry of Transportation.

Action plans developed by the Task Group focus on: removal of identified regulatory barriers to recycling; public and user-agency education; development of markets for recyclable materials, and: specification of recyclable materials.

Goal: To increase the use of recyclable road building materials and, in doing so, to further the general objective of diverting more recyclable materials from landfill.

OBJECTIVES OF THE TASK GROUPS

In investigating the barriers to C&D waste diversion and drafting their proposed solutions, the Task Groups followed a series of objectives:

- Observe the 3Rs hierarchy — of waste reduction, reuse and recycling — when considering options for diverting C&D materials from disposal. The 3Rs should be an essential consideration in all aspects of construction, from design through demolition.

- Identify issues, barriers and other concerns that affect the on-site or off-site reduction of C&D waste materials. The fair sharing of 3Rs and waste disposal costs are a particular concern of C&D Strategy Team members.

- Identify issues, barriers and other concerns that affect the environmentally and economically-sustainable recycling and market development for C&D-derived

materials. Virgin and recovered materials should compete on a "level playing field."

- Identify innovative approaches, opportunities and solutions for the reduction of C&D waste materials, recycling and market development. Develop these ideas into workable plans, programs and systems that address the economic, regulatory, technical, educational and communications concerns of the construction industry. Where possible, public policy instruments which feature voluntary compliance and economic incentives/disincentives are favoured over regulatory approaches.

- Create a province-wide recycling infrastructure and market development strategy to promote growth in secondary material demand for C&D-derived waste materials that will keep pace with the available supply. Effort should be made to "close the loop" and, collectively, find construction-related markets for those secondary materials recovered .

- Develop specific recycling and market development implementation plans in areas of strategic importance.

- Encourage the establishment of procurement policies that create markets for recycled-content materials. Ensure that standards are not written in such a way as to inhibit the use of recycled materials.

- Identify the need for, and encourage the support of, research and development of new 3Rs technologies and new products that process or incorporate recycled materials for which markets do not currently exist.

- Create a spirit of cooperation among stakeholders to promote reduction, reuse, recycling and market development solutions. Ensure that the construction industry is aware of the resources available to identify 3Rs opportunities, and to find markets for their materials.

- Develop effective communications among stakeholders within and throughout the broader construction industry. Encourage professional development to assist in implementation of 3Rs methods and use of recovered materials.

ACCOMPLISHMENTS TO DATE

At the time this report was drafted, members of the C&D Strategy Team had already completed several of the initiatives recommended by the Task Groups.

These include:

The preparation and publication of
"Designing with the Environment: A Professional's Guide."
The goal of the 10-page guide is to foster environmental awareness among design professionals and promote the examination of design options, including 3Rs opportunities, that may be available. The publication consists of a series of checklists that cover: predesign and facility requirements; design development; engineering; landscaping; interior space planning; specifications and documentation; construction and demolition; and facility management. The document also contains lists of reference sources and information contacts.

The preparation and release of the
"Ontario Construction Industry 3Rs Code of Practice.
The one-page code will — through a checklist of reduction, reuse and recycling techniques — promote 3Rs practices among the members of the Ontario construction industry and divert construction materials from disposal. (The text of the Code of Practice is reproduced on page 34.)

The placement of several outreach articles in the C&D trade press.
Articles outlining the activities of the C&D Strategy Team, as well as general waste diversion issues in the construction industry, have been placed in a number of trade publications. These include the Daily Commercial News ("Builders to follow three Rs code," January 15, 1993), the Real Estate News ("Home renovations can be green," August 21, 1992), Toronto Construction News ("Strategy team aims to divert waste from landfill," September/October, 1992), Ontario Recycling Update ("Notes from the WRO," December, 1992), and The Chatham Daily News ("Builders must make use of 3Rs Code of Practice," January 27, 1993).

Related accomplishments of the industry that promote C&D materials diversion appear throughout the text of this report.

The 3Rs Code of Practice has been endorsed by:

Canadian Standards Association
Council of Ontario Construction Associations
Electrical Contractors Association of Ontario
Grand Valley Construction Association
Greater Toronto Home Builders' Association
Heavy Construction Association of Toronto
Independent Contractors Group
London & District Construction Association
Mechanical Contractors Association of Ontario
Metropolitan Toronto Demolition Contractors Association
Niagara Construction Association
Ontario General Contractors Association
Ontario Hot Mix Producers Association
Ontario Home Builders' Association
Ontario Industrial Roofing Contractors Association
Ontario Painting Contractors Association
Ontario Sewer & Watermain Contractors Association
Ottawa Construction Association
Provincial Building & Construction Trades Council of Ontario
Sarnia Construction Association
Sudbury Construction Association
Toronto Construction Association
Utility Contractors Association of Ontario

Ontario Construction Industry 3Rs Code of Practice

January 1993

The Ontario construction industry has adopted this Code of Practice relating to the 3Rs of waste management: **REDUCE**, **REUSE** and **RECYCLE**. This Code will give the construction industry a point of reference from which to coordinate its activities. The Code demonstrates the commitment to working toward sustainable development, recognizing the need to balance environmental and economic considerations. The Code outlines the commitment of the Ontario construction industry to responsible management of its waste stream and material resources. The Code is not intended to be a comprehensive document establishing a construction industry standard for the 3Rs of waste management.

The Ontario construction industry will promote strategies to reduce the amount of waste being sent to landfill. This commitment goes beyond simple compliance with the letter and spirit of the law: it involves a commitment to leadership by taking the initiative to employ advanced material management techniques.

Construction industry members are encouraged to consider implementing the following principles and initiatives to the extent practical, recognizing members' individual business and operating constraints:

REDUCE

- promote the Ontario construction industry's commitment to reduce the waste stream;
- incorporate 3Rs waste management considerations into the preplanning of projects;
- investigate construction techniques, technologies and design which produce less waste;
- target factors which contribute to excessive waste generation;
- consider purchasing options that minimize packaging and product waste;
- purchase construction materials in dimensions and quantities to satisfy project requirements; and
- avoid damage of construction materials by proper on-site handling and storage.

REUSE

- consider methods of reusing materials on site where appropriate;
- separate materials on site for reuse purposes where appropriate;
- strip reusable materials out of buildings during demolition and renovation if practical; and
- network locally to identify markets for reusable materials.

RECYCLE

- investigate methods of recycling material resources;
- separate material on site for recycling purposes where practical;
- use recycled-content and recyclable construction materials;
- co-operate with private and government initiatives to divert recyclables from disposal; and
- network locally to identify markets for recyclable materials.

Chapter 3

Barriers and Roadblocks

The C&D Waste Reduction Strategy Team has identified a number of barriers that currently inhibit the diversion of construction and demolition materials from disposal. These barriers may be regulatory, economic, technical or perceptual, but for the purposes of this report, have been grouped into five categories:

- * education and communication barriers,
- * market & economic barriers,
- * specifications & standards,
- * regulatory barriers, and
- * technology & infrastructure barriers.

EDUCATION & COMMUNICATION BARRIERS

- The Ontario construction industry is a diverse mix of thousands of small and large companies, union and non-union firms, seasonal operations, specialized contractors, subcontractors and large, integrated companies. There is no single association representing all sectors and trades in the construction industry. This makes it difficult to disseminate information on 3Rs programs and opportunities.

- The complexity of modern design and construction makes coordination of 3Rs projects a problem, particularly when there are so many firms and contractors — designers, developers and dozens of construction trades — involved in a single project.

- There may be a lack of communication about waste reduction/diversion priorities between the designer/architect and the general contractor/subcontractors. In addition, designers generally prescribe "what to build" not "how to build it."

- There is a lack of information on the quality and usefulness of recycled/recovered building and construction materials among architects and designers, builders, procurement officers, standard-setting organizations, consumers and other stakeholders.

- There is a lack of 3Rs-related training programs in the construction industry.

- Some members of the construction industry regard virgin materials as "safer" than recycled/recovered materials. In addition, government agencies may devalue the reputation of recycled materials by referring to them as "wastes."

- There is a certain skepticism on the part of user agencies (such as municipal engineering departments, design professionals and other stakeholders) as to the benefits of waste diversion programs. There is a lot of work, at least over the short-term, to incorporate 3Rs initiatives into current C&D practices. Not all industry members have shown the necessary commitment to making such initiatives a success.

- Recycling and solid waste management operations have a public image problem. Opposition to possible traffic, noise, aesthetic and siting issues has resulted in NIMBY-like opposition to proposed transfer and processing facilities.

MARKET & ECONOMIC BARRIERS

- In part because of conditions imposed by climate and geography, the Ontario construction industry is a seasonal industry, operating at high speed at certain times of the year and relatively dormant at others. The industry is also cyclical and susceptible to general economic upswings and downturns. This means that both the supply of feedstocks for the recycling industry and the markets for recovered materials are highly variable.

- The quality of recyclable feedstocks may vary widely, complicating processing and impacting on the value of the recovered materials. In addition, incomplete or improper source separation may result in contamination of recycling bins and restrict the value of the recovered materials.

- Historically, the costs of the common alternatives to recycling — landfilling, the export of wastes to the U.S., and (in some cases) illegal dumping — have generally been very low. This has acted as a disincentive to recycling and other 3Rs initiatives and jeopardized the flow of recyclable feedstocks.

- The fixed handling and processing costs of recycling may increase the cost differential between virgin and recycled materials.

- Some jurisdictions have placed stringent restrictions on the landfilling of certain C&D materials and raised the tipping fees for those residual materials that are still accepted. Other municipalities and U.S. landfills have place few restrictions on disposal and/or charge much lower tipping fees.

- There are few economic incentives for recycling. The current tax structure in Ontario and Canada often inadvertently encourages waste generation. For instance, to obtain lower municipal property taxes, unoccupied buildings are being demolished to create "vacant" land.

SPECIFICATIONS & STANDARDS BARRIERS

- Many of the barriers related to construction specifications are closely linked to the markets for recycled materials in a kind of "chicken-and-egg" relationship. Significant quantities of certain recovered/recycled construction materials are not being produced and marketed because such materials are not currently being specified in building plans. Architects and designers are not incorporating recycled materials into specifications because those materials may not be widely available, the requisite standards have not been established and because of design and product liability concerns over "unproven" recycled-content products.

- Current specifications, building codes and other related standards may restrict the use of recycled/recovered materials. In addition, the lack of performance-based standards may support the use of virgin materials over recycled products.

- Very few codes and standards actually encourage the use of recycled materials. There is a need for the development of technical and quality assurance standards for recycled materials.

- While specifications, codes and standards are a complex subject, there's a need to break new ground in the area of specifying recycled/recovered building and construction materials. However, standard-setting agencies have exhibited some conservatism in reassessing their standards from a 3Rs perspective.

- Designing a building or construction project with its future reuse, adaptability, decommissioning and recyclability in mind is not yet common practice in Ontario.

REGULATORY BARRIERS

- The current regulatory scheme is complex. There are 56 provincial regulatory authorities under 19 provincial ministries with some responsibility for overseeing C&D activity in Ontario. They administer more than 60 codes, 280 provincial acts, and 450 regulations. Enforcement is carried out by more than 3,000 municipal building regulatory agencies scattered throughout Ontario, as well as a number of provincial agencies.

- Four levels of government — federal, provincial, regional and municipal — all have roles to play. Their actions are, at best, uncoordinated and, at worst, contradictory.

- There are some regulatory restrictions on the use of recycled materials. For instance, Ministry of Transportation specifications for certain high traffic volume routes permit only virgin materials be used in the surface mix.

- There is no province-wide standard on C&D waste disposal. Municipalities have adopted different approach; certain recyclable wastes have been banned from landfilling in some jurisdictions but not others.

- Many municipalities do not permit recycled materials to be used.

- Guidelines, standards, policies and regulations may be drafted without industry input. Addressing regulatory concerns is problematic in that many members of the construction industry do not have access to, or information about, regulatory decision-making activities that effect them directly.

- The approvals process for 3Rs activities and facilities is confusing, expensive and time-consuming. The end results are unpredictable and, by no means certain. The private sector may be reluctant to invest in 3Rs ventures under such conditions.

TECHNOLOGY & INFRASTRUCTURE BARRIERS

- There are a number of job site constraints on the success of C&D waste diversion initiatives. Job site source separation may entail certain costs, in terms of labour, the provision of equipment, the efficiency of bin use, etc. There may be limits on the space available for on-site separation.

- Wastes generated on a residential site, may differ from those generated on IC&I sites or other construction projects. While there are certain common features, different waste diversion procedures may need to be instituted for each project.

- There may be difficulty in separating materials during demolition projects. The tight schedule for demolition projects may restrict the opportunity for salvage.

- It is not always clear who has responsibility for on-site source separation or how associated costs should be apportioned. The general contractor has little control over the amount of waste generated by subcontractors who, in turn, have little incentive to source separate wastes.

- Collection and separation of recyclable C&D materials may be difficult. There are significant amounts of certain materials being generated in many locations scattered across the province.

- In addition to shortfalls in recycling capacity, construction activity may be concentrated in areas of the province not well served by a collection and processing infrastructure.

- There is a lack of technical information on recycled/recovered products. Design professionals and specification writers resist new products that have had limited testing.

- There is a need for research in the areas of new 3Rs processing and secondary material-derived products. There is a strong link between the development of more efficient recycling technologies and the development of markets for new recycled materials and products. Markets will not reach their full potential until cost-effective processing technologies and infrastructure are available.

Chapter 4

The Action Plans

Each of the Action Plans prepared by the Task Groups includes a series of standard components that outlines the objective(s) and the specific steps that must be taken to fully realize that objective. A common format was developed for presenting the proposed Action Plans, incorporating:

- a simple, clear title,
- a brief description of the initiative,
- a chronology of the key steps required,
- the suggested organization(s) responsible for undertaking those steps,
- target durations for activities, and
- any linkages to other programs or organizations.

The full Action Plans are included in Appendix B.

EDUCATION & COMMUNICATION ACTION PLANS

The size and diversity of the construction industry represents an immense barrier to the development and implementation of waste diversion initiatives. A series of related Action Plans address the need to effectively communicate 3Rs information, opportunities and policies to the various individuals, companies, agencies and associations who have an impact on C&D waste diversion.

The most comprehensive and resource-intensive Action Plans are those that relate to on-site construction and demolition activities (such as materials handling and use, storage and source separation). Opportunities for incorporating the 3Rs will have to be conveyed to managers of both large and small businesses and, in turn, field personnel that number in the tens of thousands. Programs will have to accommodate the varying education and experience levels of the work force, as well as language and literacy barriers. In addition, Action Plan activities must be on-going and continuous in response to the seasonal and transitory nature of the workers in the construction industry.

Additional Action Plans are designed to instill a higher level of awareness of: the principles of 3Rs design (designed to reduce the generation of C&D wastes); good building maintenance practices (which will extend the useful life of current building resources); and the availability and uses of recycled C&D materials. Such programs will help to open up new markets for such materials.

Related Action Plans:
Action Plan #1: Expand and promote BUILD GREEN education programs
Action Plan #2: Promote 3Rs principles of design
Action Plan #3: Develop building environmental rating program
Action Plan #4: Disseminate 3Rs educational material
Action Plan #5: Promote building maintenance practices
Action Plan #6: Develop and deliver on-site 3Rs communications
Action Plan #7: Document 3Rs case studies
Action Plan #8: Integrate pollution prevention into sector business strategy
Action Plan #9: Develop asphalt and concrete education program

MARKET & ECONOMIC ACTION PLANS

The Action Plans in this category address two traditional supply & demand prerequisites for developing and supporting: (1) appropriate uses/markets for C&D materials, and (2) markets for construction materials which have a significant recycled-content.

The Action Plans in the first category are designed to create a climate (through identifying and promoting economic incentives to reuse and/or recycle) that encourages C&D firms to seek out markets for their secondary materials. They also help waste generators to identify available markets for their waste materials and make appropriate matches. Where markets do not currently exist, these development needs will be addressed by Action Plans grouped in the Technology & Infrastructure category.

The recycled-content related Action Plans are aimed at developing information that allows consumers to identify or recognize materials which have a recycled content that meet their construction needs. They would also promote procurement policies in both the public and private sectors that would encourage the purchase of such products.

The Action Plans designed to develop appropriate markets for C&D-derived secondary materials can be quickly initiated but will require ongoing maintenance and attention. Those that address the need to incorporate recycled content in construction materials are all longer term or ongoing tasks.

Related Action Plans:
Action Plan #10: Consolidate market information resources
Action Plan #11: Expand markets through BUILD GREEN programs
Action Plan #12: Develop and promote procurement policies
Action Plan #13: Design and deliver market development workshops
Action Plan #14: Develop economic incentives for recycling

SPECIFICATIONS & STANDARDS ACTION PLANS

Government agencies, both federal and provincial, have significant potential to increase the use of recycled materials through proactive incorporation of percentage recycled-content clauses in material specifications. The National Master

Specifications and the Ontario MBS Master Specifications are examples of government documents that should be revised to this end. Currently, specifications that require or are based on the use of "virgin" materials may restrict recycled products from fulfilling functional requirements or market needs.

The development of new standards and the revision of existing standards will complement the amendment of the government specifications. New standards would address the use of recycled materials and components, and encourage designers to specify such materials in projects. (Liability concerns limit the use of materials or products that are not recognized by standards.)

The use of contract documents to require on-site source separation and waste reduction practices by contractors is also identified as an important initiative. Several Action Plans address the "contract language" of the construction process. Changes in this area will have a significant impact on the way recycling practices and materials are incorporated into projects, as well as providing a stimulus to the markets for C&D materials derived from waste.

It is recognized that the process of amending and writing standards is a long-term activity that involves industry and other stakeholder input, as well as appropriate R&D and material testing efforts.

Related Action Plans:
Action Plan #15: Utilize MTO reuse/recycling potential
Action Plan #16: Optimize recycling potential of road building specifications
Action Plan #17: Specify 3Rs plans in construction contracts at the tender stage
Action Plan #18: Consolidate MRF "bale" specifications
Action Plan #19: Develop end-use specifications and standards

POLICY & GUIDELINE ACTION PLANS

One of the fundamental principles that guided the members of the Strategy Team in developing its Action Plans was the emphasis on co-operative and voluntary actions, as opposed to mandatory or regulatory compliance instruments. However, it was recognized that the regulatory framework complements the overall objective of waste reduction.

Existing regulatory barriers have been identified and their removal recommended. In addition, the Action Plans will identify areas where new regulatory and other policy initiatives would contribute directly to waste reduction (without placing onerous new compliance requirements on the private sector or the public).

It is recommended that 3Rs considerations become an integral part of all construction projects at the project approval stage (starting with the site plan approval and including the building/demolition permit). This would involve submission of a 3Rs management plan that covers, for example, the use of recycled or low-waste materials, source separation plans, waste disposal arrangements, and design/engineering considerations.

Other Action Plans in this category address the need to: produce a series of guides to environmental and 3Rs regulations; develop building conservation guidelines; and promote the effective utilization of recycled asphalt and concrete.

Related Action Plans:

Action Plan #20: Promote effective utilization of asphalt and concrete resources
Action Plan #21: Provide industry guidance on environmental regulations
Action Plan #22: Develop model 3Rs plans for municipal approvals and permitting
Action Plan #23: Develop building conservation guidelines

TECHNOLOGY & INFRASTRUCTURE ACTION PLANS

Action Plans in this category address the technology and infrastructure needs of the construction industry. These are designed to: expand the use or application of waste-derived materials; develop new 3Rs technologies; and increase the industry's capacity to incorporate recycled materials in its projects.

The reuse of building materials and fixtures can have a significant impact on the diversion of C&D materials from disposal. The need for and viability of "reuse centres" is demonstrated by the number of such facilities that have opened in Southern Ontario over the last few years. One Action Plan is designed to produce a guide for establishing a reuse centre that can be used by entrepreneurs and municipalities. It will also show proponents how to avoid the problems and pitfalls that other centres have experienced. The other Action Plan will direct R&D efforts to those areas where markets and/or new technologies are needed to divert potentially reusable or recyclable materials from disposal.

Related Action Plans:

Action Plan #24: Prepare guide for reuse centre development
Action Plan #25: Target 3Rs research and development — Road Construction Sector
Action Plan #26: Target 3Rs research and development — Building Construction Sector

Chapter 5

Implementing the Action Plans

It is the position of the Strategy Team that C&D secondary materials are a potential resource. To maximize the utilization of this resource, future action among stakeholders must be developed in a complementary way that optimizes the benefit derived from the collective investment of resources in the 3Rs. Because interest in C&D material utilization is shared by so many, a cooperative approach is essential in diverting this resource from disposal.

Stakeholders that participated on the Strategy Team have derived consensus on advice to agencies well positioned to influence change. Specific advice is expressed in the form of proposed action plans that are intended for implementation by a select group of lead agencies (see Table 5.1). Many other organizations are also identified as key participants needed to provide support to the agencies that accept the lead coordination, facilitation and implementation role.

Proposed action plans address a wide range of 3Rs activities. The major areas of focus within which specific action plans are proposed include education and communication, market development and economic incentives for reuse and recycling, specifications and standards, policy and guideline mechanisms, and technology and infrastructure requirements. Although the duration of proposed initiatives is estimated in this report, further plan refinements by the lead agencies will improve the estimated delivery schedule.

The overall success of the collective 3Rs strategy proposed by the Strategy Team depends upon the receipt of "expressions of commitment" from the agencies identified to take on the lead role for each and every action plan. Lead agencies identified to accept the lead role are urged to consider the Strategy Team's request. The request requires the agencies to confirm their acceptance of the leadership role, review and refine the proposed action plans, and begin implementation at the earliest opportunity.

In support and on behalf of the Strategy Team's request, the MOEE's Waste Reduction Office asks for a letter from each of the specified lead agencies. The letter would outline the "expressions of commitment" to accept the specific task or tasks, refinements to the proposed action plans where appropriate (i.e., objectives, key steps, delivery schedule, resources, organizational linkages, etc.) and a clear indication of where external support is needed to achieve the final steps of each plan.

To sustain the current momentum and cooperative spirit of the broad stakeholder group, progress meetings are proposed for Fall, 1993 and Spring, 1994, to hear presentations on achievements derived from the ongoing efforts in support of the proposed action plans. Proceedings of such progress meetings would be documented for the collective benefit of all participants, and suggestions considered for further improvements where appropriate.

Considerable time and effort have been expended by the Strategy Team participants. A new focus aimed towards the cooperative implementation of plans will help to ensure the wise use of C&D materials in Ontario.

TABLE 5.1
DELIVERY SCHEDULE OF PROPOSED ACTION PLANS

#	Action Plan	Lead Agency	Duration*
	Education & Communication Action Plans		
1	Expand and promote BUILD GREEN education programs	BUILD GREEN	1 year
2	Promote 3Rs principles of design	OAA	1-2 years
3	Develop building environmental rating program	MBS Design Services	1-2 years
4	Disseminate 3Rs educational material	COCA	6 months
5	Promote building maintenance practices	TRAC	6 months
6	Develop and deliver on-site 3Rs communications	COCA	8-12 months
7	Document 3Rs case studies	WRO	6 months
8	Integrate pollution prevention into sector business strategy	CIAC	6-9 months
9	Develop asphalt and concrete education program	OHMPA	2 years
	Market & Economic Action Plans		
10	Consolidate market information resources	OWE	6-9 months
11	Expand markets through BUILD GREEN programs	BUILD GREEN	12-18 months
12	Develop and promote procurement policies	MBS	12-18 months
13	Design and deliver market development workshops	WRO	6 months
14	Develop economic incentives for recycling	COCA	9-12 months
	Specifications & Standards Action Plans		
15	Utilize MTO reuse/recycling potential	MTO	ongoing
16	Optimize recycling potential of road building specifications	MTO	ongoing
17	Specify 3Rs plans in construction contracts at tender stage	CSC	18-24 months
18	Consolidate MRF "bale" specifications	OWMA	9-12 months
19	Develop end-use specifications and standards	BUILD GREEN	2-3 years
	Policy & Guideline Action Plans		
20	Promote effective utilization of asphalt and concrete resources	WRO	1 year
21	Provide industry guidance on environmental regulations	WRO	6-9 months
22	Develop model 3Rs plan(s) for municipal approvals and permitting	AMRC	12-18 months
23	Develop building conservation guidelines	TRAC	18-24 months
	Technology & Infrastructure Action Plans		
24	Prepare guide for reuse centre development	AMRC	9-12 months
25	Target 3Rs research and development — Road Construction Sector	OHMPA	2-5 years
26	Target 3Rs research and development — Building Construction Sector	COCA	2-5 years

* estimated duration from unspecified start date (excluding ongoing activities)

APPENDIX A

Acronyms

AMRC	Association of Municipal Recycling Coordinators
AMO	Association of Municipalities of Ontario
APAO	Aggregate Producers Association of Ontario
APEO	Association of Professional Engineers of Ontario
ARIDO	Association of Registered Interior Designers of Ontario
BEPAC	Building Environmental Performance Assessment and Certification
BOMA	Building Owners and Managers Association
CARI	Canadian Association of Recycling Industries
CEIA	Canadian Environmental Industries Association
CEO	Consulting Engineers of Ontario
CGSB	Canadian General Standards Board
CIAC	Construction Industry Advisory Committee
CMHC	Canada Mortgage and Housing Corporation
COCA	Council of Ontario Construction Associations
CSA	Canadian Standards Association
CSC	Construction Specifications Canada
CWME	Canadian Waste Materials Exchange
GIPPER	Governments Incorporating Procurement Policies to Eliminate Refuse
GTHBA	Greater Toronto Home Builders' Association
IRAP	Industrial Research Assistance Program
ISTC	Industry, Science and Technology, Canada
IWDP	Industrial Waste Diversion Program
MAC	Ministerial Advisory Committee
MBS	Management Board Secretariat (formerly MGS)
MCTR	Ministry of Culture, Tourism and Recreation
ME&T	Ministry of Education and Training
MEA	Municipal Engineers Association
MEDT	Ministry of Economic Development and Trade (formerly MITT)
MGS	Ministry of Government Services (now MBS)
MITT	Ministry of Industry, Trade and Technology (now MEDT)
MMA	Ministry of Municipal Affairs
MNR	Ministry of Natural Resources
MOEE	Ministry of Environment and Energy
MOH	Ministry of Housing
MTO	Ministry of Transportation
NMS	National Master Specifications
OAA	Ontario Association of Architects
OALA	Ontario Association of Landscape Architects
OARS	Ontario Association of Roads Superintendents
OBOAI	Ontario Building Officials Association Inc.
ODC	Ontario Development Corporation
OEN	Ontario Environment Network

OGCA	Ontario General Contractors Association
OGRA	Ontario Good Roads Association
OHBA	Ontario Home Builders' Association
OHMPA	Ontario Hot Mix Producers Association
OPPI	Ontario Professional Planners Institute
OPS	Ontario Provincial Standards
ORBA	Ontario Road Builders' Association
OSWCA	Ontario Sewer and Watermain Contractors Association
OWE	Ontario Waste Exchange
OWMA	Ontario Waste Management Association
PACSB	Public Affairs and Communications Services Branch (MOEE)
RCO	Recycling Council of Ontario
RMCAO	Ready-Mixed Concrete Association of Ontario
TCA	Toronto Construction Association
THB	Toronto Historical Board
TRAC	Toronto Region Architectural Conservancy
UDI	Urban Development Institute
WMB	Waste Management Branch (MOEE)
WRO	Waste Reduction Office (MOEE)

ACTION PLAN NO. 1: **EXPAND AND PROMOTE "BUILD GREEN"**

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO PROMOTE THE USE OF THE BUILD GREEN RESOURCE CENTRE AND TO DEVELOP SCHOOL CURRICULUM TO ENCOURAGE OUR YOUTH TO CONSERVE VALUABLE MATERIAL RESOURCES.**

LEAD AGENCY: **BUILD GREEN**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Encourage architects, engineers, interior designers, contractors and other experts to use BUILD GREEN Resource Centre.	ongoing	MBS Green Workplace, GIPPER, ORTECH, OAA, ARIDO
2	Promote BUILD GREEN Resource Centre through BUILD GREEN Newsletter.	ongoing	ORTECH, GTHBA, MBS Green Workplace
3	Develop opportunities for visibility: breakfast meetings; seminars; conferences; directories.	ongoing	GIPPER, ORTECH, GTHBA, MBS Green Workplace
4	Expand BUILD GREEN Curriculum project to include French language materials, regional workshops, travelling displays etc.	1 year	MBS Green Workplace, ME&T, GIPPER
5	Establish a community outreach program in conjunction with large construction projects.	ongoing	MBS Green Workplace, GIPPER

ACTION PLAN NO. 2: **PROMOTE 3RS PRINCIPLES OF DESIGN**

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO REDUCE WASTE GENERATION FROM NEW CONSTRUCTION, RENOVATION AND DEMOLITION ACTIVITIES THROUGH A REDUCTION, REUSE AND RECYCLING APPROACH ADOPTED AT THE DESIGN STAGE. INCREASED AWARENESS OF THE 3RS AND DESIGN METHODS AMONG DESIGN PROFESSIONALS ARE NEEDED TO EFFECT THIS CHANGE. THIS PLAN PROPOSES ACTION TO (A) CREATE A CODE OF PRACTICE (B) DEVELOP A STATEMENT OF DESIGN PRINCIPLES (C) PROMOTE LINKAGES AMONG DESIGN PROFESSIONALS AND (D) DISSEMINATE DESIGN INFORMATION.**

LEAD AGENCY: **ONTARIO ASSOCIATION OF ARCHITECTS**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Identify relevant professional organizations and establish special task group.	2 months	OAA, ARIDO, CEO, OALA, MBS, WRO
2	Review existing state of current 3Rs practice in each discipline; compile and review resource materials.	3-4 months	"
3	Draft model Design Professionals' Code of Practice and Statement of 3Rs Principles of Design.	2-4 months	"
4	Circulate draft "Code" and "Statement" for comment to appropriate professional design organizations and revise for adoption.	3 months	"
5	Joint public announcement of "Code" and "Statement".	2 months	"
6	Hold joint design "workshop" to explore methods, materials and interdisciplinary issues.	3 months	"
7	Solicit funding to publish workshop proceedings and distribute through professional design organizations; feature highlights of report through articles in professional design newsletters.	6-12 months (ongoing)	"

ACTION PLAN NO. 3: **DEVELOP BUILDING ENVIRONMENTAL RATING PROGRAM**

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO DEVELOP AN ONTARIO "BEPAC-LIKE" PROGRAM TO ASSESS NEW DESIGN AND CONSTRUCTION BY A SET OF ENVIRONMENTAL CRITERIA.**

LEAD AGENCY: **MANAGEMENT BOARD SECRETARIAT - DESIGN SERVICES BRANCH**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Review BEPAC for 3Rs and other criteria.	1 month	OAA, ARIDO, CEO
2	Confirm licensing arrangement/agreement.	1 month	OAA, BEPAC
3	Identify Ontario stakeholders in BEPAC type program.	1 month	OAA, MBS, ARIDO, CEO, WRO
4	Establish Ontario program group.	2 months	"
5	Create Ontario version of BEPAC in consultation with stakeholders.	3 months	"
6	Develop implementation program.	2 months	OAA & MBS
7	Set funding requirements for implementation.	1 months	"
8	Solicit public and private funding sources.	6 months	OAA, MBS, ARIDO, CEO, MOEE

ACTION PLAN NO. 4: DISSEMINATE 3RS EDUCATIONAL MATERIALS

BRIEF DESCRIPTION: THE PURPOSE OF THIS PLAN IS TO REDUCE WASTE GENERATION FROM NEW CONSTRUCTION, RENOVATION AND DEMOLITION BY INCREASING AWARENESS AMONG THE INDUSTRY ON WAYS TO BE LESS WASTEFUL. A COMMUNICATIONS PLAN IS NEEDED TO DISSEMINATE NEWLY DEVELOPED 3RS MATERIAL SUCH AS THE ONTARIO CONSTRUCTION INDUSTRY'S 3RS CODE OF PRACTICE, THE NEW 3RS REGULATIONS AND PROMOTION OF THE CONSERVER SOCIETY ETHIC.

LEAD AGENCY: COUNCIL OF ONTARIO CONSTRUCTION ASSOCIATIONS

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Develop screening criteria for communications materials that is consistent with MOEE and industry's 3Rs commitment.	1 month	WRO, MOEE PACSB, OHBA
2	Inventory all communications materials that satisfy the screening criteria such as the Ontario Construction Industry 3Rs Code of Practice, ***Designing with the Environment***, news releases & backgrounders re. new 3Rs Regs. etc.	1 month	"
3	Identify information gaps and propose plans to develop other communications materials where necessary.	1 month	"
4	Develop & implement a plan to effectively disseminate materials to the complete range of target audiences in the Ontario construction industry.	2 months	"
5	Promote 3Rs Code of Practice at all Ontario construction industry functions; follow up to identify relevant organizations/ associations not yet targeted; seek to expand endorsement of 3Rs Code of Practice.	ongoing	"
6	Promote new 3Rs Regs. at all Ontario construction industry functions.	ongoing 93-94	"

ACTION PLAN NO. 5: PROMOTE BUILDING MAINTENANCE PRACTICES

BRIEF DESCRIPTION: THE PURPOSE OF THIS PLAN IS TO RECOGNIZE THAT THE PRESERVATION OF MATERIAL RESOURCES IN THE EXISTING BUILDING STOCK IS ESSENTIAL TO MAINTAINING THEM IN ACTIVE USE.

LEAD AGENCY: TORONTO REGION ARCHITECTURAL CONSERVANCY

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Determine and inventory the many factors which promote poor maintenance practices.	1 month	OAA, BOMA, Heritage Canada
2	Stress the importance of water control in the training of architects, engineers and other design professionals.	ongoing	OAA, ARIDO, CEO, APEO
3	Encourage building inspectors to be proactive in water control.	ongoing	AMO
4	Identify financial incentives for maintenance.	1 month	Heritage Canada, OAA, ARIDO, CEO, APEO, BOMA
5	Identify financial disincentives for maintenance.	1 month	"

ACTION PLAN NO. 6: DEVELOP AND DELIVER ON-SITE 3RS COMMUNICATIONS

BRIEF DESCRIPTION: THE ENORMITY AND DIVERSITY OF THE ONTARIO CONSTRUCTION INDUSTRY MAKES IT EXTREMELY DIFFICULT TO IMPLEMENT UNIVERSAL 3RS PROGRAMS ON AN AD HOC BASIS. THEREFORE THE NEED EXISTS TO DEVELOP A FORMAL COMPREHENSIVE COMMUNICATION AND EDUCATION PROGRAM DIRECTED SPECIFICALLY AT JOBSITE ACTIVITIES. THIS PROGRAM WOULD INCLUDE SUCH ITEMS AS A WASTE DIVERSION GUIDE, HOW-TO GUIDELINES ON COMPLIANCE WITH 3RS REGULATIONS, SAMPLES FOR WASTE AUDIT/REDUCTION WORKPLAN REPORTS, SOURCE SEPARATION, WORKER TRAINING ETC.

LEAD AGENCY: COUNCIL OF ONTARIO CONSTRUCTION ASSOCIATIONS

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Establish special task group for entire program.	1 month	OHBA, OGCA
2	Establish priority list of communication and education program items.	1 month	"
3	Determine estimated cost and other resource requirements for each item on priority list.	1 month	"
4	Determine preferred source for obtaining necessary resources for each item on priority list.	1 month	"
5	Determine which program items can be completed with minimal resource requirements; delegate responsibility and set target dates etc.	1 month	"
6	Prepare submissions to appropriate agencies requesting commitment of resources.	2 months	"
7	Update meeting to cover: (a) status of work on Item 2d; (b) availability of resources based on Item 3; (c) how to proceed on further program items.	1 month	"

ACTION PLAN NO. 7: **DOCUMENT 3RS CASE STUDIES**

BRIEF DESCRIPTION: **AN ASSEMBLY OF CASE STUDIES THAT CONVEY CLEAR EXAMPLES OF SUCCESSFULLY IMPLEMENTED WASTE REDUCTION MEASURES IS NEEDED TO GUIDE THE ONTARIO CONSTRUCTION INDUSTRY ON HOW EACH MEMBER GROUP CAN CONTRIBUTE. THE PURPOSE OF THIS PLAN IS TO MINIMIZE WASTE GENERATION BY SYSTEMATICALLY DOCUMENTING AND SHARING SUCCESSFUL EXPERIENCES AS MODELS FOR USE BY OTHERS.**

LEAD AGENCY: **WASTE REDUCTION OFFICE**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Develop a common, yet simple outline to document "tried & proven" 3Rs measures.	1 month	COCA, OHBA, ReUze, OWE, BUILD GREEN, Metro, RCO, MOEE PACSB
2	Assemble existing case studies that illustrate successful experiences throughout the C&D sector.	3 months	"
3	Develop a plan for widespread delivery of case studies that include an easy feedback opportunity from those who wish to share other 3Rs success stories.	2 months	"
4	Develop a mechanism for updating a common inventory of case studies.	1 months	"
5	Offer case study information to interested parties on an ongoing basis and integrate into a communication and training program.	ongoing	"

ACTION PLAN NO. 8: INTEGRATE POLLUTION PREVENTION INTO SECTOR BUSINESS STRATEGY

BRIEF DESCRIPTION: THE CONSTRUCTION INDUSTRY IS APPLYING TO THE MEDT (FORMERLY MITT) SECTOR PARTNERSHIP FUND TO DEVELOP AN OVERALL CONSTRUCTION SECTOR BUSINESS STRATEGY. THIS PLAN ENSURES A COMPONENT WILL INCLUDE SOLID WASTE MANAGEMENT AND 3RS CONSIDERATIONS.

LEAD AGENCY: CONSTRUCTION INDUSTRY ADVISORY COMMITTEE

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Establish special task group to develop framework for 3Rs component.	1 month	OHBA
2	Complete framework for 3Rs component.	1 month	"
3	Meet with MEDT Construction Industry Advisory Council (CIAC) reprentatives to discuss nature of 3Rs component.	1 month	"
4	Prepare draft report.	1 month	"
5	Obtain and review feedback from MEDT CIAC.	1 month	"
6	Prepare final report.	1 month	"
7	Approve report.	1 month	

ACTION PLAN NO. 9: **DEVELOP ASPHALT & CONCRETE EDUCATION PROGRAM**

BRIEF DESCRIPTION: **DEVELOP PUBLIC AND USER-AGENCY EDUCATION PROGRAMS TO (A) PROMOTE GREATER MARKET ACCEPTANCE OF RECYCLED ROAD BUILDING MATERIALS AND (B) DISPEL MISCONCEPTIONS ABOUT THE NATURE AND ENVIRONMENTAL IMPACT OF ASPHALT.**

LEAD AGENCY: **ONTARIO HOT MIX PRODUCERS ASSOCIATIONS**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Develop factual printed material about asphalt and concrete recycling, including discussion of environmental factors, plan for use and distribution.	6-9 months	RMCAO, APAO, ORBA
2	Develop and maintain data base for technical and promotional information about asphalt and concrete recycling. Promote availability of resource material.	ongoing	RMCAO, APAO, ORBA
3	Develop slide or VHS program(s) for use at public meetings etc.	6-9 months	RMCAO, APAO, ORBA
4	Develop and implement media campaign to educate the public about recycled materials.	12-18 months	RMCAO, APAO, ORBA, MTO, WRO
5	Develop "Speakers Bureau" resource persons to deliver presentations to public/user-agency groups.	9-12 months	RMCAO, APAO, ORBA, MTO, WRO
6	Develop curriculum aids for use in Ontario schools.	12-24 months	RMCAO, APAO, ORBA, MTO, WRO
7	Identify municipalities where one-on-one educational approach is required and initiate case-specific strategies.	ongoing	RMCAO, APAO, ORBA, MTO, WRO
8	Sponsor recycling demonstration projects in target markets.	ongoing	RMCAO, APAO, ORBA, MTO, WRO

ACTION PLAN NO. 10: CONSOLIDATE MARKET INFORMATION RESOURCES

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO COORDINATE THE EFFORTS OF ALL GROUPS OFFERING MARKET INFORMATION AND TO TAILOR INFORMATION TO THE SPECIAL NEEDS OF THE C&D INDUSTRY.**

LEAD AGENCY: **ONTARIO WASTE EXCHANGE**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Assemble information for all groups and produce a series of one page fact sheets describing each organization.	2 months	RCO, WRO, AMRC, Metro Works Dept.
2	Print copies and arrange for distribution of fact sheets.	1 month	RCO, WRO
3	Establish mechanism for updating fact sheets and ongoing distribution.	1 month	"
4	Improve and expand format of RCO Markets Directory.	3 months	RCO, WRO, AMRC, AMO
5	Develop linkages with other directory producers to ensure complementary uses of resources.	2 months	RCO, AMRC, WRO, AMO
6	Appoint part-time C&D specialist for OWE and establish and create separate but integral C&D database.	ongoing	MOEE and other funding agencies
7	Feedback on R&D needs for materials with no current markets and infrastructure.	ongoing	RCO, WRO, MOEE IWDP
8	Feedback to manufacturers on opportunities for new product development.	ongoing	RCO, CARI, CEIA, entrepreneurs etc.

ACTION PLAN NO. 11: EXPAND MARKETS THROUGH "BUILD GREEN" PROGRAMS

BRIEF DESCRIPTION: THIS PLAN ESTABLISHES A PROMOTION CAMPAIGN FOR BUILD GREEN, THE BUILD GREEN LABEL WITH MINIMUM RECYCLED CONTENT REQUIREMENTS AND THE DEVELOPMENT OF A CONSUMER PRODUCTS CHOICE GUIDE.

LEAD AGENCY: BUILD GREEN

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Work with construction materials suppliers to encourage greater use of recycled content.	ongoing	MBS Green Workplace, MOEE, GIPPER
2	Use government building projects as test sites for BUILD GREEN materials.	ongoing	"
3	Use signage to promote BUILD GREEN.	ongoing	"
4	Link BUILD GREEN to Green Communities Retrofit Program.	3 months	MBS, MOEE
5	Encourage residential home builders to use BUILD GREEN products.	ongoing	GTHBA, ORTECH, MBS, OHBA
6	Define BUILD GREEN requirements; establish recycled content specifications and performance standards for BUILD GREEN Label.	immediate	ORTECH, GTHBA, MBS, WRO
7	Roll out BUILD GREEN Label Program with at least 25 companies/products.	6 months	"
8	Consolidate screening criteria for product inclusion in a consumer products choice guide.	1 month	"
9	Prepare a Consumer Products Choice Guide	6 months	"
10	Deliver Guide and document changing product consumption patterns.	ongoing	"

ACTION PLAN NO. 12: DEVELOP AND PROMOTE PROCUREMENT POLICIES

BRIEF DESCRIPTION: THE PURPOSE OF THIS PLAN IS TO ENCOURAGE THE PURCHASE OF RECYCLED CONTENT AND OTHER ENVIRONMENTALLY RESPONSIBLE BUILDING MATERIALS AND PRODUCTS BY BOTH THE PUBLIC AND PRIVATE SECTORS.

LEAD AGENCY: MANAGEMENT BOARD SECRETARIAT

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	All performance and cost issues being equal, governments (municipal and provincial) should give preference to BUILD GREEN materials.	1 year	MBS Green Workplace, GIPPER
2	Source BUILD GREEN materials and showcase in areas of high public visibility.	ongoing	MBS Green Workplace, GIPPER, ORTECH
3	Prequalify and/or evaluate bids on the basis of environmental design factors in all government projects.	ongoing	MBS Green Workplace, GIPPER
4	Identify private sector purchasing decision makers and how to reach them.	2 months	MBS Green Workplace, GIPPER, ORTECH
5	Identify closed loop opportunities ie. where people could buy back secondary materials.	2 months	"
6	Target key C&D private sector purchasers with BUILD GREEN info, MBS Procurement Policies etc.	ongoing	"
7	Work with private sector to implement procurement policies and undertake innovative purchasing.	ongoing	"

ACTION PLAN NO. 13: DESIGN AND DELIVER MARKET DEVELOPMENT WORKSHOPS

BRIEF DESCRIPTION: **ENTREPRENEURS AND LOCAL ECONOMIC DEVELOPMENT GROUPS NEED EXPOSURE TO GROWING 3RS OPPORTUNITIES. THE PURPOSE OF THIS PLAN IS TO ACCELERATE THE MARKET DEMAND FOR SECONDARY MATERIALS BY STIMULATING LOCAL ECONOMIC DEVELOPMENT COMMUNITIES TO INVEST RESOURCES IN REUSE AND RECYCLING VENTURES.**

LEAD AGENCY: **WASTE REDUCTION OFFICE**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Target a community (Hamilton-Wentworth) that shares interest in the concept and is prepared to host a pilot workshop.	completed	Hamilton- Wentworth
2	Develop terms of reference for the pilot workshop on market development for secondary materials.	completed	"
3	Deliver the pilot workshop in Hamilton-Wentworth.	**June 23-24 1993**	Hamilton-Wentworth, consultant
4	Evaluate the pilot workshop design and modify as necessary for widespread use throughout Ontario.	2 months	"
5	Develop a plan for systematically delivering market development workshops throughout targeted communities in Ontario.	1 month	"

ACTION PLAN NO. 14: DEVELOP ECONOMIC INCENTIVES FOR RECYCLING

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO DEVELOP ECONOMIC INCENTIVES THAT WILL SUPPORT REUSE AND RECYCLING INDUSTRIES AND MAKE SECONDARY MATERIAL RESOURCES COST COMPETITIVE WITH VIRGIN MATERIALS.**

LEAD AGENCY: **COUNCIL OF ONTARIO CONSTRUCTION ASSOCIATIONS**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Organize meeting of all applicable Ontario government agencies to explore general support for economic incentives to promote the use of secondary materials.	1 month	OHMPA, Finance, MBS, MTO, MNR, MEDT, Housing, Labour
2	Form special task group to identify and assess realistic areas where economic incentives can be practically put into place; develop specific options.	3 months	"
3	Deliver options to applicable Ontario government agencies.	2 months	"
4	Develop and implement strategy to begin immediate dialogue with appropriate agencies to encourage positive and timely action.	4 months	"

ACTION PLAN NO. 15: UTILIZE MTO REUSE/RECYCLING POTENTIAL

BRIEF DESCRIPTION: **MTO HAS THE POTENTIAL WITHIN EXISTING SPECIFICATIONS, STANDARDS AND PRACTICES TO INCREASE THE USE OF RECYCLED ASPHALT AND CONCRETE PRODUCTS IN THEIR CONSTRUCTION AND MAINTENANCE ACTIVITIES. THE PURPOSE OF THIS PLAN IS TO ENSURE THAT MTO'S EXISTING REUSE AND RECYCLING POTENTIAL IS MAXIMIZED.**

LEAD AGENCY: **MINISTRY OF TRANSPORTATION**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Emphasize successes and document reasons for lack of reuse and recycling (R&R).	ongoing	ORBA, OHMPA, OGRA, OARS, APAO
2	Communicate R&R potential to Regional Geotechnical & Engineering Materials Office.	ongoing	"
3	Attend meeting(s) of Regional Geotechnical and Engineering Materials Heads to promote increased R&R.	ongoing	"
4	Meet regularly with MTO Senior Management to redefine MTO R&R potential.	ongoing	"

ACTION PLAN NO. 16: OPTIMIZE RECYCLING POTENTIAL OF ROAD BUILDING SPECIFICATIONS

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO PROMOTE INCREASED USE OF RECYCLED ROAD BUILDING MATERIALS THROUGH USER-AGENCY MATERIAL SPECIFICATIONS.**

LEAD AGENCY: **MINISTRY OF TRANSPORTATION**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Liaison with OPSS and promotion of standard recycled materials specifications to municipalities.	ongoing	OHMPA, ORBA, APAO, OGRA, OPS
2	Investigate the potential of changing MTO specifications to allow generally greater recycled materials content and, specifically, to permit the use of recycled asphalt in heavy-duty binder mixes (following trial mix development and assessment of test projects).	ongoing	OHMPA, ORBA, APAO, OGRA
3	Liaison with provincial and municipal user-agencies to allow for higher-ratio recycling in specifications.	ongoing	MEA, MTO, OGRA, APAO

ACTION PLAN NO. 17: SPECIFY 3RS PLAN IN CONSTRUCTION CONTRACTS AT TENDER STAGE

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO REQUIRE ALL BIDDERS TO SUBMIT A PROPOSED 3RS PLAN FOR EACH PROJECT.**

LEAD AGENCY: **CONSTRUCTION SPECIFICATIONS CANADA**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Form special task group to provide recommended text requiring 3Rs plan with contract bid to government agencies, professional and trade associations for consideration and implementation.	3 months	NMS, OAA, CEO
2	Include 3Rs plan spec in all MBS and other Ontario government agencies' contract documents for all government and consultant generated work requiring government approval.	6 months	MBS, OAA, CEO
3	Include 3Rs plan spec in Metro Toronto and all other major municipal authorities for all municipal work.	6 months	Metro, AMO
4	Construction Specification Canada (CSC) Toronto Chapter to publish 3Rs plan spec in monthly newsletter.	1 month	NMS, OAA, CEO
5	CSC Technical Studies Committee to prepare for implementation of 3Rs plan spec as a CSC sanctioned procedure.	2 months	"
6	OAA, ARIDO, CEO, APEO & others to implement 3Rs plan spec as an association sanctioned procedure.	3 months	OAA, ARIDO, CEO, APEO, NMS
7	Promote 3Rs plan spec to COCA, OGCA, TCA & other trade associations.	ongoing	"
8	Approach National Master Specicfications (NMS) Secretariat with 3Rs plan spec and implement 3Rs plan spec in Ontario and National Building Codes.	1 year	"

ACTION PLAN NO. 18: CONSOLIDATE MRF "BALE" SPECIFICATIONS

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO INVENTORY ALL EXISTING "BALE SPECS" FOR REUSABLE AND RECYCLABLE C&D MATERIALS SO THAT THESE MATERIALS CAN BE DELIVERED TO PROCESSORS IN SUCH A WAY AS TO MAXIMIZE THEIR UTILIZATION, AND HENCE THEIR DIVERSION FROM DISPOSAL.**

LEAD AGENCY: **ONTARIO WASTE MANAGEMENT ASSOCIATION**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Establish special task group to categorize materials currently recycled and not recycled.	1 month	CARI, CEIA, COCA, OWE, BUILD GREEN, Metro Works, WRO
2	Prepare lists and specifications for all secondary materials that are currently or could potentially be recycled.	3-6 months	"
3	Develop a financial analysis of the recyclability of each material.	1 year	"
4	Distribute specifications and financial analysis for each recoverable C&D material through appropriate organizations.	ongoing	"
5	Invite scrap dealers, recyclers and processors to a forum to discuss proposed specifications.	3-6 months	"

ACTION PLAN NO. 19: DEVELOP END-USE SPECIFICATIONS AND STANDARDS

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO DEVELOP MINIMUM RECYCLED CONTENT SPECIFICATION FOR THOSE ITEMS OFFERED AS PRODUCTS CONTAINING RECYCLED CONTENT AND TO ENSURE THAT BUILDING SPECIFICATIONS AND STANDARDS DO NOT IMPEDE THE USE OF RECYCLED CONTENT MATERIALS.**

LEAD AGENCY: **BUILD GREEN**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Ensure that definitions of what constitutes a product with recycled content are developed through CSA, BUILD GREEN or other accredited organizations.	2 years	CSA, CGSB, BUILD GREEN, Environmental Choice Ecologo, WRO, MBS
2	Introduce minimum recycled content specifications to BUILD GREEN, CSA and Environmental Choice Ecologo programs.	3 months after #1	"
3	Ask all organizations with standards and specifications referring to construction materials to review these to ensure they are all performance related and do not impede the use of recycled content materials.	2 years	MBS, WRO, Min. of Housing, CSA, CMHC, CGSB, MTO, AMO

ACTION PLAN NO. 20: **PROMOTE EFFECTIVE UTILIZATION OF ASPHALT AND CONCRETE RESOURCES**

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO PROVIDE A CLEAR UNDERSTANDING OF THE ACCEPTABLE OPTIONS FOR UTILIZING ASPHALT, CONCRETE AND OTHER MATERIALS COMMONLY ENCOUNTERED DURING ROAD CONSTRUCTION AND MAINTENANCE. A GUIDELINE WILL BE DEVELOPED AND DISTRIBUTED THROUGHOUT THE ROAD CONSTRUCTION INDUSTRY, MTO AND MOEE TO INCREASE THE COMMON UNDERSTANDING OF HOW THESE MATERIALS CAN BE REUSED, RECYCLED OR MANAGED IN ACCORDANCE WITH EXISTING REGULATIONS.**

LEAD AGENCY: **WASTE REDUCTION OFFICE**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Update the conditions that constitute a revised "MTO/MOEE Agreement on the Management of Excess Materials Generated from Road Construction and Maintenance."	2 months	MTO, MOEE WMB
2	Develop a guideline entitled "Options for Utilizing Asphalt and Concrete Resources" based on the acceptable conditions and permissible practices embodied in the MTO/MOEE Agreement.	6 months	MOEE WMB, MTO
3	Transmit draft guideline to MTO & MOEE Regions and Districts, WMB, Approvals Branch and Ontario construction industry for comments.	3 months	MTO, OHMPA, ORBA, RMCAO, APAO, OGRA, MEA, OSWCA
4	Finalize guideline.	1 month	MTO, OHMPA, ORBA, RMCAO, APAO, OGRA, MEA, OSWCA
5	Transmit guideline to all MTO & MOEE divisions and entire Ontario construction industry.	1 month (ongoing)	OHMPA, ORBA, RMCAO, APAO, OGRA, MEA, OSWCA

ACTION PLAN NO. 21: PROVIDE INDUSTRY GUIDANCE ON ENVIRONMENTAL REGULATIONS

BRIEF DESCRIPTION: **THE NEED EXISTS TO CLARIFY INDUSTRY REQUIREMENTS AND DEVELOP AN UNDERSTANDING OF CURRENT ONTARIO ENVIRONMENTAL LEGISLATION. THE PURPOSE OF THIS PLAN IS TO DEVELOP A GUIDE FOR REFERENCE BY THE ONTARIO CONSTRUCTION INDUSTRY THAT OUTLINES THE PURPOSE, APPLICABILITY AND RESPONSIBILITIES FOR ENVIRONMENTAL PROTECTION AND COMPLIANCE.**

LEAD AGENCY: **WASTE REDUCTION OFFICE**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Develop an inventory of environmental legislation and policy that has potential to impact any form of C&D activity.	2 months	COCA, OHBA, OHMPA, ORBA, OGCA
2	Develop a common outline to summarize the relevance of each regulation and policy.	1 month	"
3	Prepare summary guide for common reference by the construction industry.	4 months	"
4	Distribute summary guide through industry associations & MOEE.	ongoing	"

ACTION PLAN NO. 22: DEVELOP MODEL 3RS PLAN(S) FOR MUNICIPAL APPROVALS AND PERMITTING

BRIEF DESCRIPTION: **APPLICATION OF MUNICIPAL SITE PLAN APPROVALS INCREASINGLY REQUIRE SUBMISSION OF WASTE REDUCTION/MANAGEMENT PLANS. THIS PLAN PURPOSES A "MODEL WASTE DIVERSION PLAN" BE DEVELOPED THAT WOULD BE MADE AVAILABLE FOR ADOPTION OR INCORPORATION INTO THE MUNICIPAL APPROVALS/PERMITTING PROCESS.**

LEAD AGENCY: **ASSOCIATION OF MUNICIPALITIES OF ONTARIO**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Establish a special task group of identified key players, associations and representatives involved with municipal approvals and permitting processes.	2 months	WRO, AMO, OPPI, OBOAI, OAA, CEO, UDI, MMA, MEA, OWMA
2	Develop base model waste diversion plan(s) and guideline(s) to suit (a) site plan approvals and (b) building/demolition permitting.	6-12 months	"
3	Distribute draft model plan(s) and guideline(s) to key players for comments and revise as required.	2 months	"
4	Distribute revised model waste diversion plan(s) and guideline(s) to interested municipalities, planning, building departments, associations etc.	1 month	"
5	Monitor feedback, advise and revise as appropriate.	ongoing	"

ACTION PLAN NO. 23: DEVELOP BUILDING CONSERVATION GUIDELINES

BRIEF DESCRIPTION: **THE EXISTING BUILDING STOCK CAN BE VIEWED AS A RESOURCE THAT SHOULD BE CONSERVED. THE PURPOSE OF THIS PLAN IS TO DEVELOP GUIDELINES THAT WOULD ENABLE MUNICIPALITIES TO THOROUGHLY ACCESS A STRUCTURE'S POTENTIAL FOR REUSE OR RECYCLING.**

LEAD AGENCY: **TORONTO REGION ARCHITECTURAL CONSERVANCY**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Establish a special task group of interested stakeholders.	1 month	WRO, MCTR, OAA, Demolition & Renovation Contractors
2	Research and establish criteria by which the reuse/recycling of buildings can be measured ie. structural integrity, zoning, heritage, embodied energy, economic incentives etc.	6-12 months	"
3	Develop draft guidelines and circulate for comment to all interested stakeholders.	6-12 months	"
4	Establish liaison with MMA to determine how these guidelines could best be promoted.	2-3 months	MMA
5	Prepare final copy and circulate to all municipalities through MMA/AMO	3-6 months	MMA, AMO

ACTION PLAN NO. 24: PREPARE GUIDE FOR REUSE CENTRE DEVELOPMENT

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO PRODUCE A GUIDE ON REUSE CENTRE DEVELOPMENT FOR USE BY INTERESTED MUNICIPALITIES AND ENTREPRENEURS SO THAT THEY CAN AVOID SOME OF PROBLEMS AND PITFALLS EXPERIENCED BY OTHERS.**

LEAD AGENCY: **ASSOCIATION OF MUNICIPAL RECYCLING COORDINATORS**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Determine who should develop comprehensive workplan.	1 month	WRO, OWE, OHBA Renovators' Council, COCA
2	Create special task group to assess critical considerations: profit/non-profit, municipal/provincial/federal/ private funding, lessons from existing facilities.	3-6 months	"
3	Create municipal incentives: access to inventory, promotional support, zoning assistance, building space, relief from property & business taxes.	3-6 months	"
4	Assemble assistance from construction associations, AMO, AMRC & others.	3-6 months	"
5	Determine accessibility to local "waste" statistics ie. composition, quantity & current handling procedures.	1 month	OWMA
6	Develop generic business plan for typical reuse centre.	2-3 months	OWE, OHBA, COCA, WRO
7	Evaluate availability to private funding & financing sources	3-6 months	"
8	Decide on how to roll out "learnings" to get greater distribution of new facilities.	3-6 months	"

ACTION PLAN NO. 25: TARGET 3RS RESEARCH & DEVELOPMENT - ROAD CONSTRUCTION SECTOR

BRIEF DESCRIPTION: THE PURPOSE OF THIS PLAN IS TO ESTABLISH PRIORITIES TO TARGET RESEARCH AND DEVELOPMENT ACTIVITIES TO EXPAND MARKETS FOR REUSABLE AND RECYCLABLE ROAD CONSTRUCTION MATERIALS.

LEAD AGENCY: ONTARIO HOT MIX PRODUCERS ASSOCIATION

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Identify and promote the specification of secondary reusable and recyclable materials suitable for road construction and maintenance.	12-18 months	ORBA, APAO, OGRA, MEA, APEO
2	Identify existing and new applications for recycled granular materials and promote their use through specifications.	ongoing	ORBA, RMCAO, OGRA, MEA, APEO
3	Increase asphalt producing industry's capabilities for producing higher-ratio recycled hot mix products through (a) industry technical education and (b) development of plant and equipment to produce higher-ratio, high quality recycled products.	2-5 years	Equipment Mfrs.

ACTION PLAN NO. 26: TARGET 3RS RESEARCH & DEVELOPMENT - BUILDING CONSTRUCTION SECTOR

BRIEF DESCRIPTION: **THE PURPOSE OF THIS PLAN IS TO ESTABLISH PRIORITIES TO TARGET RESEARCH AND DEVELOPMENT ACTIVITIES TO EXPAND MARKETS FOR REUSABLE AND RECYCLABLE CONSTRUCTION MATERIALS.**

LEAD AGENCY: **ORTECH**

STEP NO.	KEY STEPS	ESTIMATED COMPLETION TIME	ORGANIZATIONAL LINKAGES
1	Identify C&D materials which currently have no or limited markets.	Sept. '93	RCO, ORTECH, MOEE, AMRC
2	Hold workshop for R&D organizations and potential funding agencies to discuss R&D needs.	Oct. '93	ORTECH, MOEE, MEDT, CEIA, MBS, IRAP, academia
3	Funding agencies provide portion of existing support funding for identified R&D.	start 94/95 ongoing	MOEE, MBS, MEDT, IRAP, ISTC, Env. Canada
4	Establish links with private sector entrepreneurs to co-sponsor R&D.	Jan. '94	CEIA, ODC, MEDT, MOEE, OWE

Strategy Team for C&D Waste Reduction

Terms of Reference
May 12, 1992

Introduction

The Ministry of the Environment's current drive towards waste diversion through the 3Rs (reduction, reuse, recycling) is part of a larger objective of changing our consumer society to a conserver society.

In March 1991, the Ministry created the Waste Reduction Office to focus attention on waste diversion and to ensure that the province meets its targets of at least 25% waste diversion by 1992 and at least 50% by the year 2000.

The Ontario government cannot achieve this goal alone; all sectors of society must be involved. Thus, the Waste Reduction Office is establishing Strategy Teams, so that those with potential to effect and be affected by this shift to a conserver society, will also have an opportunity to contribute to the development of Ontario's long term 3Rs policies and programs.

The following are the other Strategy Teams that have either been created or are proposed:

* Soil & Soil-like Materials (Materials Policy Committee)
* Municipal 3Rs Infrastructure Task Force
* Tires (Ontario Scrap Tire Task Force)
* Wet Materials - Compost
* Plastics
* Paper Fibres
* Sewage Sludge (Sludge and Waste Utilization Committee)

Objective

The primary objective of the Strategy Team will be to develop a strategy to divert C&D waste from disposal by means of the 3Rs. An independent Strategy Team for C&D Waste Reduction is needed because of the significant contribution (between 10 and 15 percent) to the municipal waste stream attributed to the construction and demolition sectors. If the province is to meet its waste diversion targets, a comprehensive strategy for reducing this portion of the waste stream must be developed.

Role of the C&D Strategy Team

The C&D Strategy Team will concentrate its efforts on developing a strategy to divert materials from disposal which are generated by residential and ICI construction, demolition, renovation and reconstruction. Although soils management is known to be a matter of widespread concern among the construction and demolition sectors, it is the subject of a separate review. The Ministry's Materials Policy Committee is preparing a discussion paper on the future options for soils management that is targeted for public release in the Spring of 1992. An Ontario-wide public consultation program is planned for a ninety day period following the discussion paper release.

It is suggested that the C&D Strategy Team undertake the following:

1) Provide a forum to identify issues, concerns and solutions for environmentally and economically sustainable C&D waste management and reduction systems;

2) Create a spirit of cooperation among stakeholders to further 3Rs solutions;

3) Develop effective communications among stakeholders so that they can identify and address key issues, provide information and propose actions.

The C&D Strategy Team will concentrate on the 3Rs of waste management, reduction, reuse and recycling. The 3Rs hierarchy will be observed when considering options for implementing measures to divert materials from disposal.

> **Reduction** is defined as those activities which decrease or eliminate the generation of waste. An example of C&D waste reduction would be standardized structural dimensions at the design stage to maximize the use of purchased building materials and eliminate off-cuts. An example of C&D waste reduction during the actual construction phase would be improved material storage to reduce damage from exposure to the elements.
>
> **Reuse** is defined as using an item again in its same form, for the same or different purpose. There is an enormous potential for reuse of selected C&D waste. An example of C&D waste reuse is dimensional lumber off-cuts as bridging, blocking and forming stakes. Another example is the removal of windows, doors, sinks, tubs and other various fixtures from renovation and demolition projects for use in future projects.
>
> **Recycling** is defined as the separation or extraction of useful materials from the waste stream to provide feedstock for the production of new products. Examples of C&D waste recycling would be the production of new drywall utilizing recycled gypsum and the manufacture of particle board from processed wood waste chips.

The C&D Strategy Team will be asked to address long term objectives and to develop concepts and action plans. The groups will be kept informed about ongoing related activities, such as issues concerning the Greater Toronto Area, the Ministry's Waste Reduction Action Plan (WRAP) and Materials Policy.

Role of the C&D Strategy Team Participants

The WRO's mandate includes consulting and involving stakeholders to achieve provincial 3Rs program and policy development objectives.

WRO staff will participate as C&D Strategy Team members and will facilitate, co-ordinate and otherwise support the functioning of the team or any one of its potential Specialty Groups (eg. Waste Material Reduction, Job-Site Technology Development, Market Development).

Members from other agencies and stakeholder groups will be required to regularly participate in meetings, provide input and advice on issues and undertake specific work tasks as necessary to assist in the functioning of the Strategy Team. Members will also be required to communicate to their stakeholder groups the results of the Strategy Team meetings and action items for their stakeholder group to undertake, as well as identify contacts likely to lead to facilitation of 3Rs initiatives (See Appendix A - Member's Duties).

How the C&D Strategy Team Will Function

There will be one main group and potentially several specialty groups. The main group will be multi-stakeholder and include individuals from the WRO, non-governmental organizations, industry, and others.

Membership will be determined in accordance with the criteria in Appendix A.

The groups will attempt to reach consensus on major C&D 3Rs issues. If consensus is not possible on specific issues, then general consensus "mapping" within the multi-stakeholder group will be carried out.

The specialty groups would focus on specific issues and report back to the main group. In order to provide some structure to the discussions it is recommended that the groups use the attached 3Rs Focus Chart (Appendix B), which is a matrix of essential construction, 3Rs and other factors, as a basis for developing and exploring concepts and ideas for future 3Rs policies and programs.

The main C&D Strategy Team will meet regularly, every eight to ten weeks or at the discretion of the Chairman; specialty groups would meet as frequently as they feel necessary, in between the main C&D Strategy Team meetings.

The following three specialty groups have been proposed:

- * Waste Material Reduction
- * Job-Site Technology Development
- * Market Development

Specialty groups will be created on an as needed basis and specific terms of reference developed for each.

APPENDIX D-1

Membership of Construction and Demolition Strategy Team

Association of Municipal Recycling Coordinators
Association of Registered Interior Designers of Ontario
Canadian Association of Recycling Industries
Canadian Standards Association
Concrete Restoration Association of Ontario
Construction Specifications Canada
Consulting Engineers of Ontario
Council of Ontario Construction Associations
Greater Toronto Home Builders' Association
Metropolitan Toronto Demolition Contractors Association
Metropolitan Toronto Works Department
Ministry of Economic Development and Trade (formerly MITT)
Ministry of the Environment and Energy
Ministry of Government Services
Ministry of Housing
Ministry of Transportation
National Research Council — Institute for Research in Construction
Ontario Association of Architects
Ontario Environment Network — Ontario Waste Caucus
Ontario General Contractors Association
Ontario Hot Mix Producers Association
Ontario Hydro
Ontario Waste Exchange
Ontario Waste Management Association
ORTECH International
Provincial Building and Construction Trades Council of Ontario
Recycling Council of Ontario
ReUze Building Centre
Toronto Region Architectural Conservancy

The members of the Strategy Team wish to express their gratitude to all of the other organizations and individuals who have participated in the various committees and sub-committees to date. Their contributions are greatly appreciated.

APPENDIX E
Glossary of Terms

3Rs
The reduction, reuse and recycling of waste.

Collection
The act of picking up materials at home, businesses or industrial sites and hauling them to a recycling facility, energy recovery plant or a landfill.

Contaminant
Foreign materials (such as dirt, organic waste, oil or the residues of containers) that make it more difficult to recycle a waste feedstock or reduce the value of the derived material.

Disposal Facility
A facility or part of a facility at which waste is intentionally placed, and at which waste will remain after closure. Landfills, landfarms or lakefills are all examples of disposal facilities.

Diversion
Using the 3Rs of waste management as part of a strategy to keep materials from going to disposal.

Environment
The most comprehensive definition of "environment" is contained in the Ontario Environmental Assessment Act: "(i) air, land or water; (ii) plant and animal life, including man; (iii) the social, economic and cultural conditions that influence the life of man or a community; (iv) any building, structure, machine or other device or thing made by man; (v) any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from the activities of man; or (vi) any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario."

IC&I Solid Waste
Industrial, Commercial and Institutional solid wastes generated by businesses and industries (including shopping centres, restaurants and offices) and institutions (such as schools, hospitals and government offices). IC&I wastes comprise approximately 60% of Ontario's total municipal solid waste stream.

Landfill
An engineered ground facility for the burial/disposal of solid, nonhazardous wastes under controlled conditions with the objective of eliminating releases to air, groundwater or neighbouring land, and minimizing environmental nuisances or hazards to public health and safety.

Material Recovery Facility (MRF)
A recycling site that receives mixed municipal wastes or source-separated materials such as used newsprint, fine paper, old corrugated containers, glass, ferrous, aluminum, PET and other plastics, wood, concrete and brick, and drywall. The MRF physically removes contaminants, sorts, grades, bales, grinds, packages and transfers the material to a recycler or end-user.

Ontario Regulation 347
Waste Management — General Regulation 347, under Ontario's Environmental Protection Act, sets out standards for solid waste disposal sites and waste management systems, and governs the handling, transport and disposal of registerable liquid industrial and hazardous wastes.

Post-Consumer Waste
Waste materials generated by consumers in homes, offices, retail outlets, and institutions.

RAP
Reclaimed Asphalt Pavement

Recyclable
According to labelling guidelines developed by Consumer and Corporate Affairs Canada, a product or package is deemed "recyclable" where at least 35% of the population across Canada has convenient access to collection or drop-off facilities for recycling that material. Where a material or product cannot be or is not reasonably expected to be recycled, no claim of recyclability may be made.

Recycled-Content
According to labelling guidelines developed by Consumer and Corporate Affairs Canada, manufacturers must indicate the percentage (by weight) of recycled material contained in a product or package in all cases where claims of recycled content are made. Unless otherwise stated, it is assumed the recycled component is derived from post-consumer materials.

Recycling
Physical, chemical or biological processes are used to transform a waste stream into the raw material need to make a new product. To be successful, recycling program requires an effective infrastructure for segregating, collecting, transporting and reprocessing the feedstock, as well as the maintenance of stable markets for the derived secondary materials.

Reduction
Industrial production changes or modified consumer practices can decrease the quantity of waste produced.

Residential Solid Waste
The waste produced by all kinds of households, including detached dwellings, row housing, condominiums and apartments. In Ontario, residential waste makes up about 40% of the total municipal solid waste stream.

Reuse
To use a product or package again, in its original form, for either the same or a different purpose. Reuse entails less intensive cleaning/reprocessing than is usually involved in recycling.

Separation
Division of wastes into groups of similar materials (either mechanically or manually).

Solid Waste
See Municipal Solid Waste.

Solid Waste Management
The entire process of collecting, sorting, processing, recycling, reclaiming and disposing of waste. The recommended waste management hierarchy begins with consideration of practicable waste reduction and reuse measures, followed by recycling and resource recovery, and finally disposal.

Source Separation
The segregation of used materials from municipal waste into specific material categories at the point of generation in order to facilitate recycling.

Tipping Fee
The amount of money charged by the operator of a transfer station or an approved waste disposal facility for receiving and managing waste. The charge may be based on either the weight or volume of the waste. Tipping fees vary widely among individual municipalities.

Transfer Station
Facility used to receive, (in some cases) sort, and temporarily store wastes and/or recyclable materials until they are shipped to another site for reprocessing or disposal.

Virgin Materials
Any raw material intended for industrial processing which has not been previously used.

Waste
According to the Environmental Protection Act, "waste" includes "ashes, garbage, refuse, domestic waste, industrial waste, or municipal refuse and other such wastes as are designated in the regulations."

Waste Reduction Workplan
According to pending regulations under the Environmental Protection Act, a "waste reduction workplan" is defined as an "organized plan of work that when implemented will maximize waste diversion from disposal including a description of specific activities, timelines, responsible parties, and expected results."

Definitions are taken, in part, from: "Solid Waste Management: A Glossary of Terms," Ontario Ministry of Environment, Public Information Centre, Winter, 1992.

APPENDIX F
Sources of Information

* 1992 Status Report; Waste Reduction, Re-use and Recycling in the Greater Toronto Area, March 1993, Ontario Ministry of Environment and Energy

* Asphalt Concrete Recycling in Canada, January 1993, John Emery Geotechnical Engineering Ltd.

* The Canadata Annual Construction Forecast, 1993-1995 Edition (Southam Construction Information Services, October 1992).

* Designing With the Environment: The Professional's Guide (C&D Waste Reduction Strategy Team, November 1992).

* G.I.P.P.E.R.'s Guide to Environmental Purchasing, October 1992, Ontario Ministry of Environment and Energy.

* Making a Molehill out of a Mountain: Reducing the Volume of Residential Construction Waste Designated for Municipal Landfill Sites (The Toronto Home Builders' Association, and Environment Ontario, 1990).

* Making a Molehill out of a Mountain II: Implementing the Three R's in Residential Construction (Canada Mortgage and Housing Corporation, The Greater Toronto Home Builders' Association, and Environment Ontario, 1991).

* Mineral Aggregate Conservation, Reuse and Recycling (John Emery, Geotech Ltd., February 1992).

* Market Assessment of 3Rs Activities in Ontario, January 1993, Ontario Ministry of the Environment and Energy.

* Metropolitan Toronto Solid Waste Composition Study, May 1991, Proctor & Redfern Ltd./SENES Consultants Ltd.

* Ontario Waste Exchange Markets database

* Preliminary Study of Construction and Demolition Waste Diversion Constraints and Opportunities, March 1992, MacViro Consultants Ltd.

* Report on Use of Reclaimed Crushed Aggregates and Reclaimed Asphalt Pavement, October 1992, DBA Engineering Ltd.

* Secondary Materials Market Directory (A Guide for Ontario Waste Generators), November 1992, Recycling Council of Ontario.

* Solid Waste Management Approaches. Discussion Paper No 3.4: Markets for Materials from Solid Waste, September 1989, Metropolitan Department of Works, Solid Waste Management Division.

* Submission to Advisory Committee on Environmental Standards (ACES), Regarding Proposed Policy for Management of Excess Soil, Rock and Like Materials, December 1992, Ontario Hot Mix Producers Association

* Waste Reduction in the Construction and Demolition Sector Summary Report, February 1992, LURA Group

Ontario

News Release
Communiqué

Ministry of Environment and Energy

Ministère de l'Environnement et de l'Énergie

October 8, 1993

Report outlines new 3Rs approach to divert construction waste from landfill

Environment and Energy Minister Bud Wildman today released a report outlining a new step-by-step approach to reduce the amount of construction waste bound for landfill sites.

The report was produced by industry, labour, other interest groups and government working together. Activities were co-ordinated by the ministry's Waste Reduction Office.

The report identifies current industry and government initiatives in applying the 3Rs to Ontario's construction industry. It addresses the barriers to increasing waste diversion, and proposes actions aimed at developing specifications for recycled materials, design methods, on-site management practices and market development. In total, the report outlines 26 action plans.

"This report will play a key role in Ontario's Waste Reduction Action Plan to reduce waste by at least 50 per cent by the year 2000," Mr. Wildman said. "This goal can only be achieved through effective and co-operative partnerships involving all sectors of society. I am very pleased to release this report during Waste Reduction Week -- at a time when so many diverse groups share our commitment to the 3Rs -- they are an excellent example of what partnership in action can accomplish."

According to the report, the construction business contributes about $35 billion to the Ontario economy annually, and provides employment for 400,000 workers. The industry includes developers, building and renovation contractors, public works builders (roads, water, sewage facilities), and demolition companies.

This business generated approximately 1.1 million tonnes of waste in Ontario in 1992, or 12% of the total municipal solid waste stream. On average, each new house constructed generates about 2.5 tonnes of waste.

The industry has made considerable strides in reducing the amount of waste going to disposal, including:

- The Build Green Program, launched by the Greater Toronto Home Builders' Association and ORTECH International, has stimulated market demand for recycled building materials and the development of these new materials.
- A 3Rs Code of Practice has been adopted by 23 Ontario construction industry associations. The code of practice commits the industry to responsible management of its waste stream and material resources. A similar guide on 3Rs for the design professions has also been produced.
- At least 50 per cent of excess road asphalt generated through road repair and reconstruction is being reprocessed into new material. Hundreds of thousands of tonnes of used concrete are being recycled into building structures and parking lots.
- Consumers are being actively encouraged by the industry to buy reused and recycled building materials, fixtures and an assortment of other items.

Some of the innovative ideas contained in the report include designing a building to be more easily "deconstructed" (instead of demolished) for recycling and reuse; co-operative purchasing arrangements that encourage bulk buying; and on-site processing of demolition materials for recycling purposes.

Over the next few months, industry, labour and government will begin implementation of the 26 action plans.

Copies of the report, Keeping C&D Materials Out of Landfills (PIBS #2718) are available by contacting the Ministry of Environment and Energy's Public Information Centre in Toronto at Tel. (416) 323-4321.

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For further information:

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Waste Reduction Office

* Il existe une version française de ce document

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Keeping C&D materials out of landfills : conserving resources and minimizing waste in the construction industry.

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